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MEAN MERIDIONAL CROSS-SECTIONS OF THE
AVAILABLE POTENTIAL ENERGY FOR EACH
APRIL AND OCTOBER OF THE PERIOD
1967 UNTIL 1976

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von

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ABSTRACT

In the framework of studies which are concerned with "physical foundations of climate" the available potential energy and its variability both in space and time was estimated by P. SPETH (1978). The computations were carried out in a mixed space-time domain for the time period 1967 through 1976 using grid-points of routine analysis of the German Weather Service, Offenbach/Main. As supplement to this study in the present report mean meridional cross-sections for each *April* and *October* of the period 1973 until 1976 are presented.

ZUSAMMENFASSUNG

Im Zusammenhang mit Arbeiten, die sich mit den "physikalischen Grundlagen des Klimas" befassen, wurde die verfügbare potentielle Energie und ihre zeitliche und räumliche Veränderlichkeit von P. SPETH (1978) berechnet. Die Untersuchungen wurden im sogenannten "mixed space-time domain" für den Zeitraum 1967 bis 1976 durchgeführt, wobei Gitterwerte von objektiven Analysen des Deutschen Wetterdienstes, Offenbach/Main, herangezogen wurden.

Als Ergänzung für diese Studie werden im vorliegenden Bericht mittlere meridionale Schnitte für jeden April und Oktober des Zeitraumes 1973 bis 1976 wiedergegeben.

The following symbols are used:

A_{MMC}	the available potential energy produced by the mean meridional circulation
$A_{MSE,1-15}$	the available potential energy produced by the mean standing eddies (wavenumbers 1 until 15)
$A_{MSE,1}$	the available potential energy produced by the mean standing eddies (wavenumber 1)
$A_{MSE,2-3}$	the available potential energy produced by the mean standing eddies (wavenumbers 2 and 3)
$A_{MSE,1-3}$	the available potential energy produced by the mean standing eddies (wavenumbers 1 until 3)
$A_{MSE,4-8}$	the available potential energy produced by the mean standing eddies (wavenumbers 4 until 8)
A_{TE}	the available potential energy produced by the transient eddies
A_{TOC}	the total available potential energy.

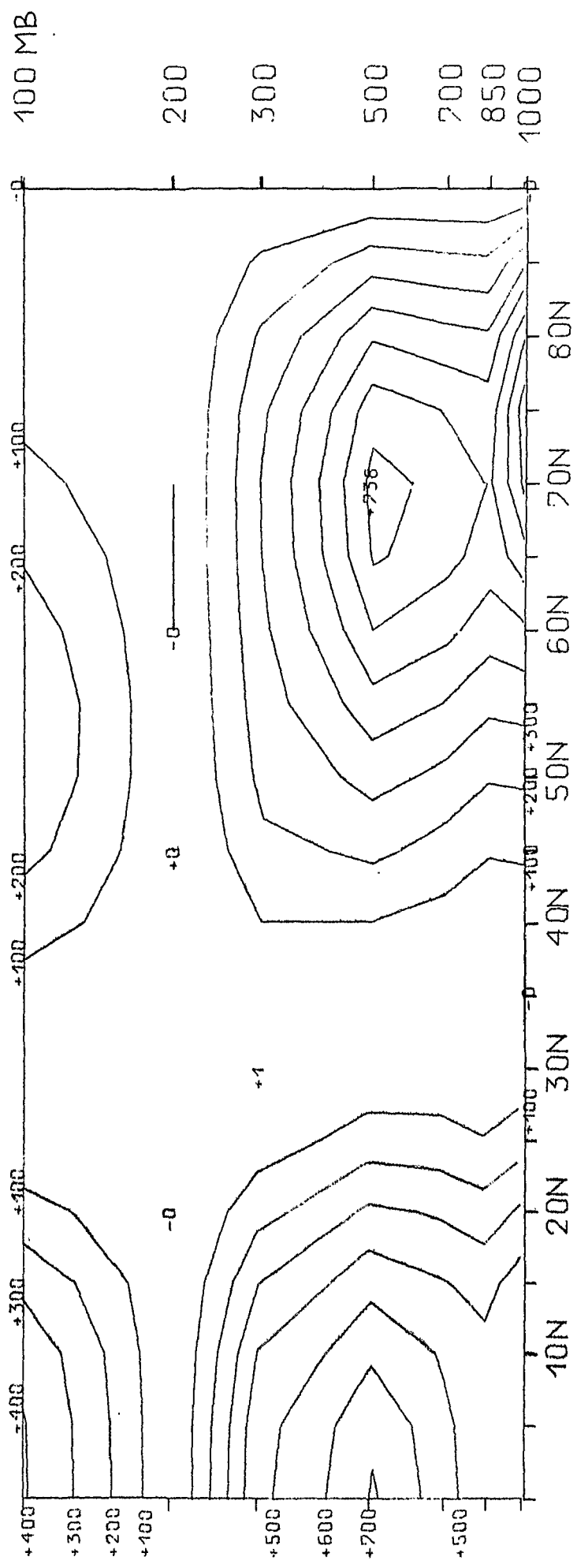
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 a ten years period (1967-1976),
 eingereicht bei Beitr. Phys. Atm. 51, 1978

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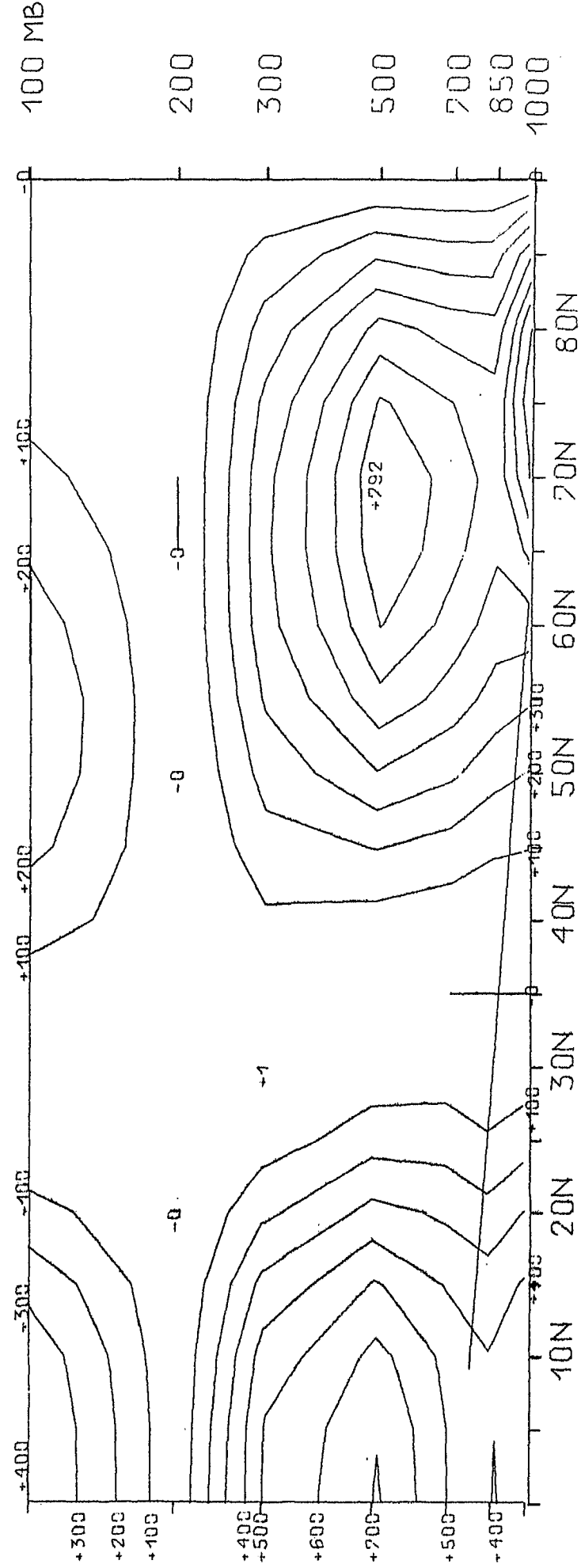
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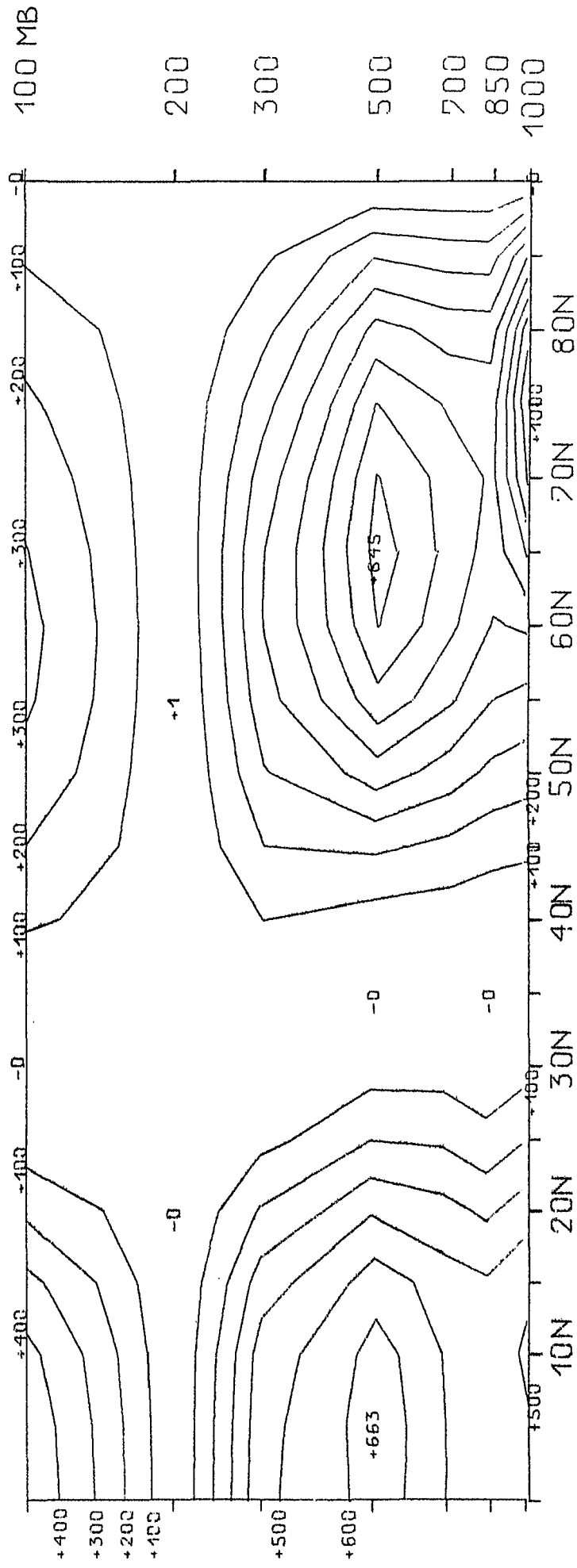
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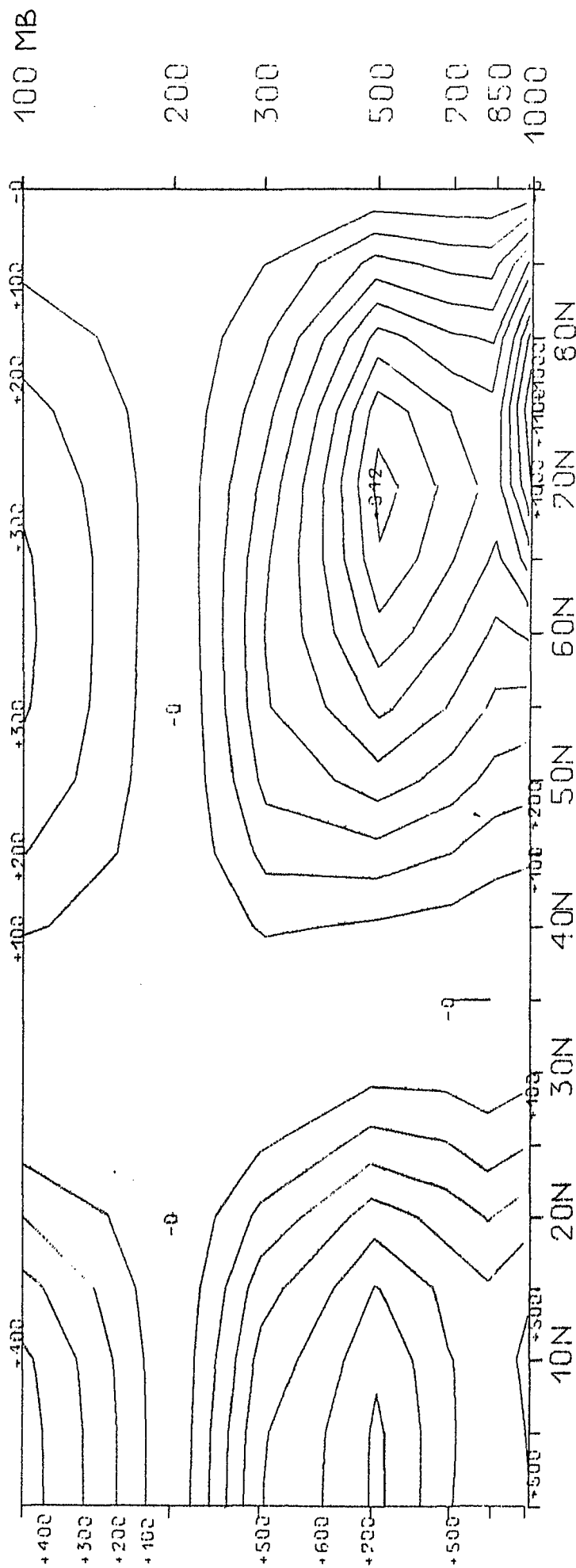
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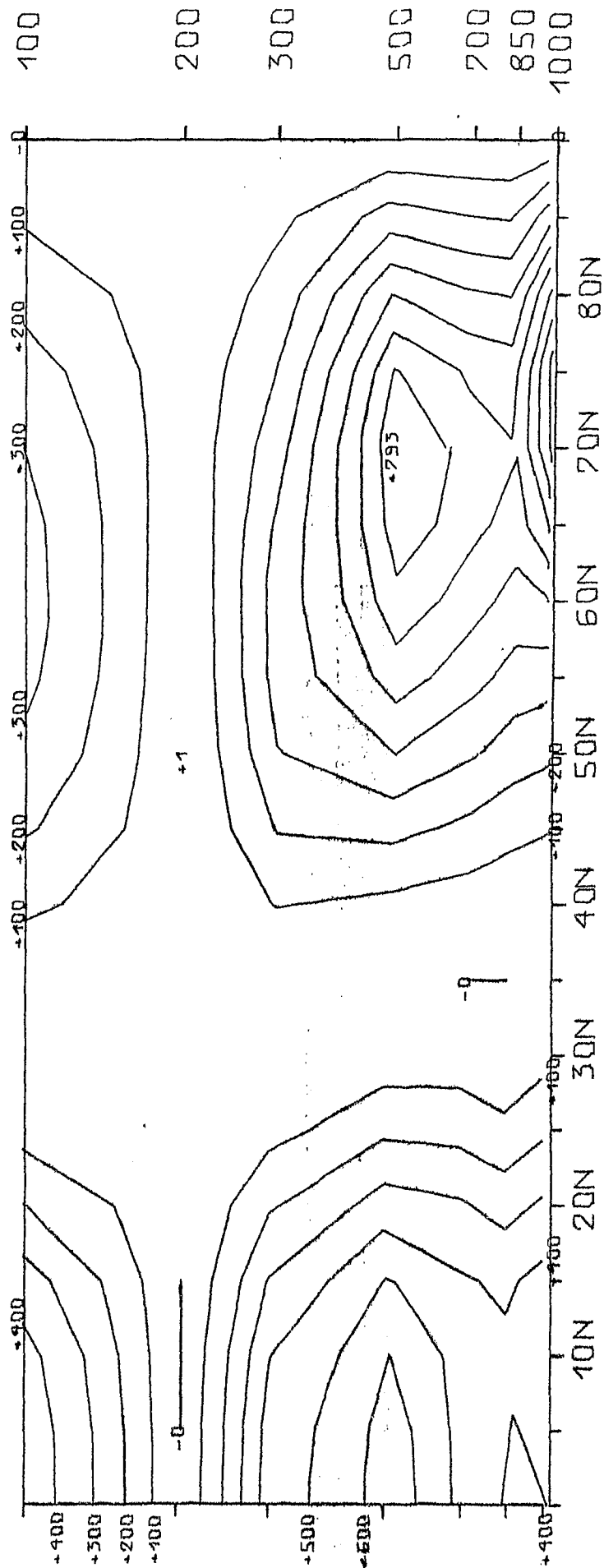
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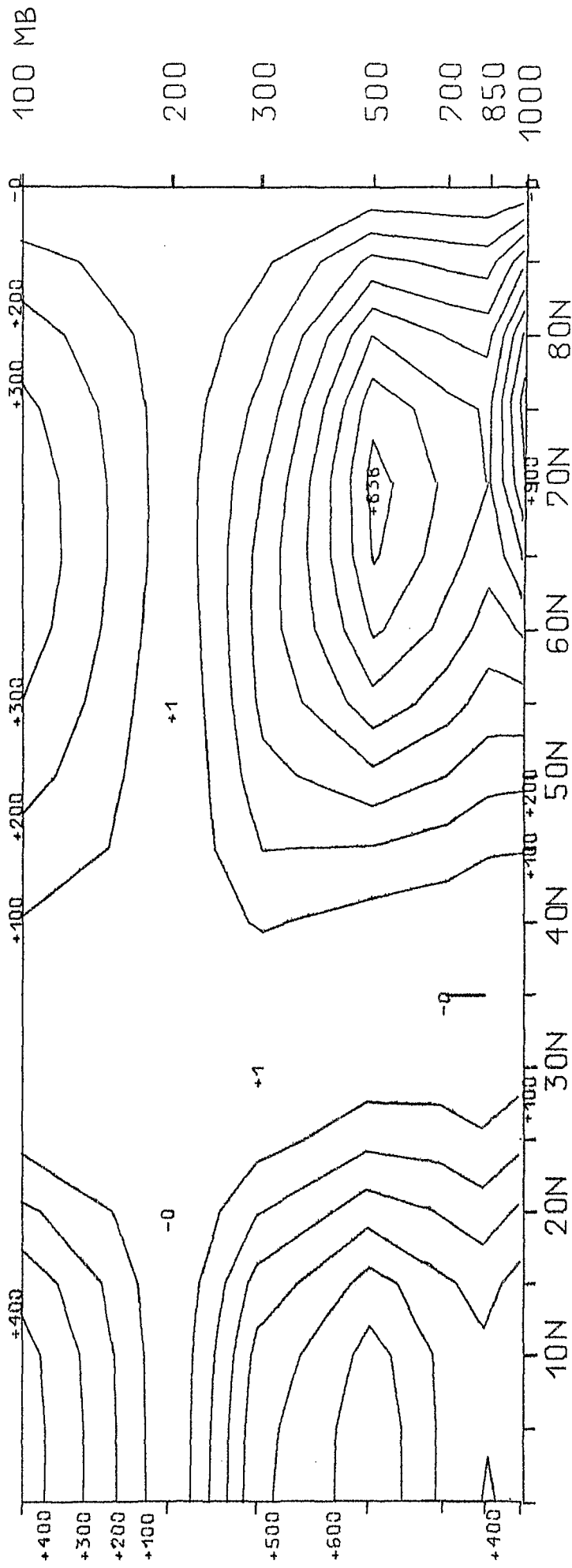
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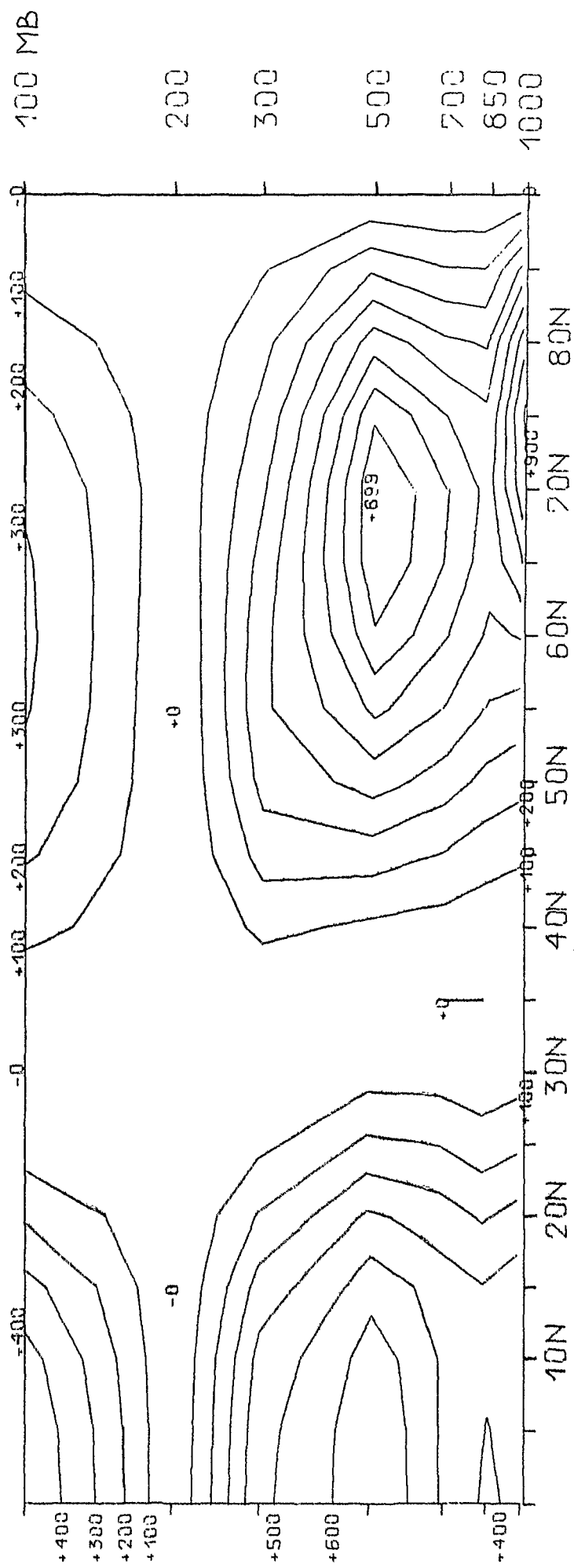
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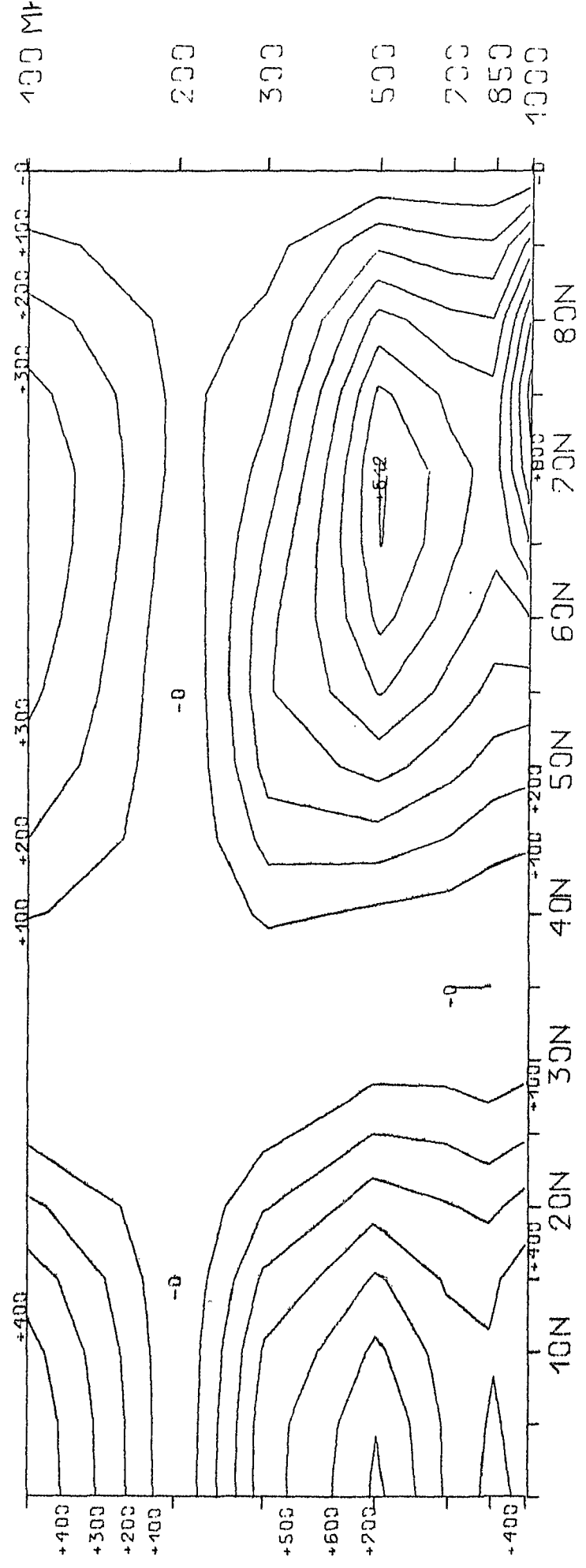
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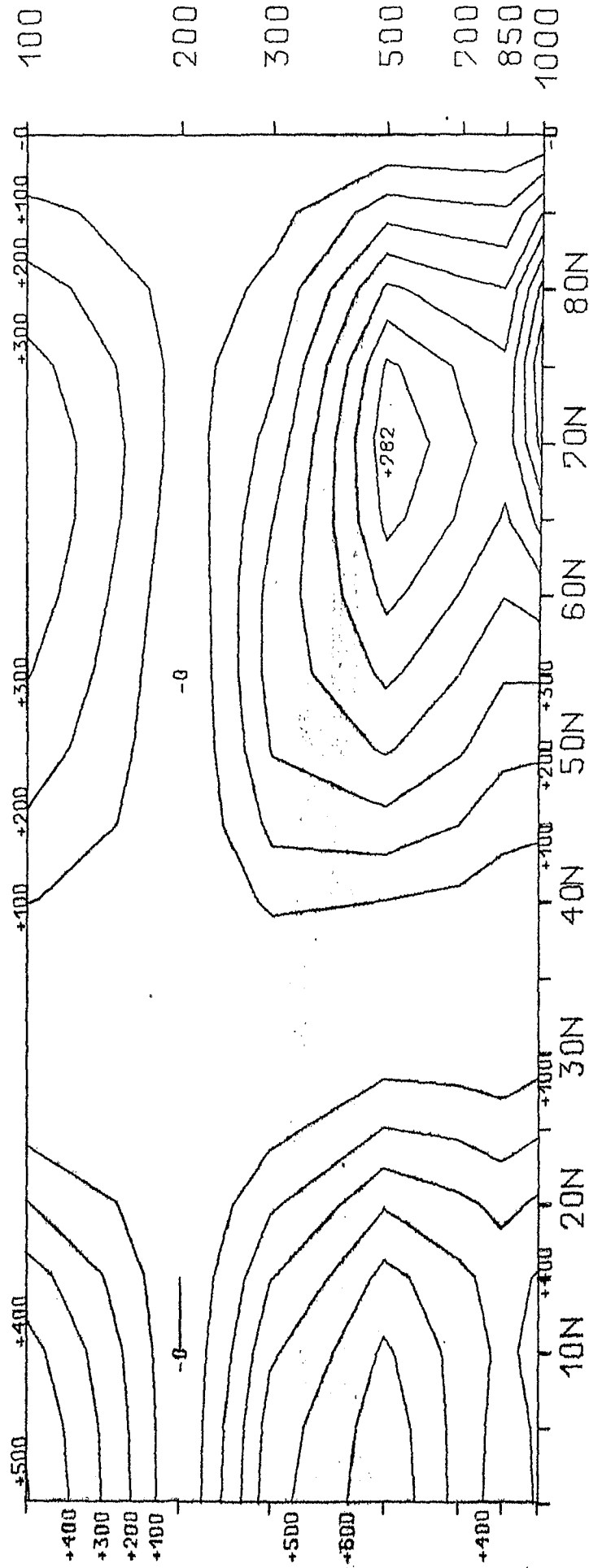
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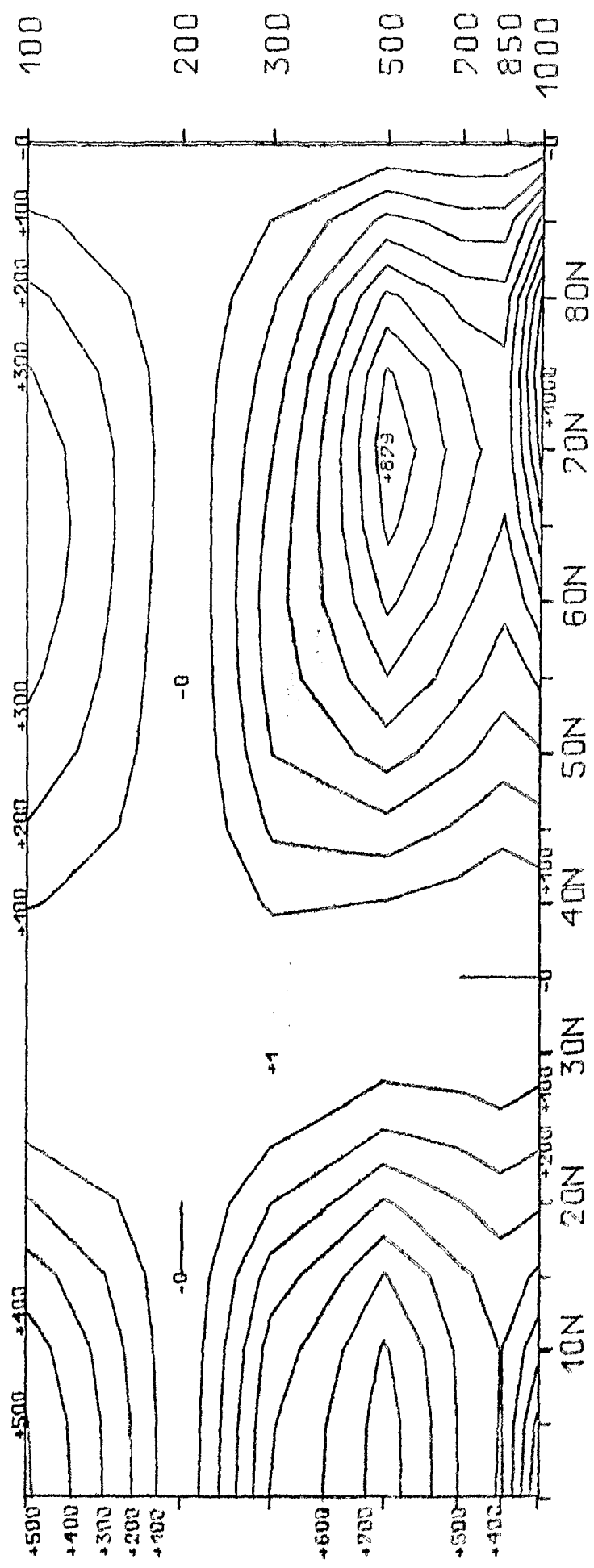
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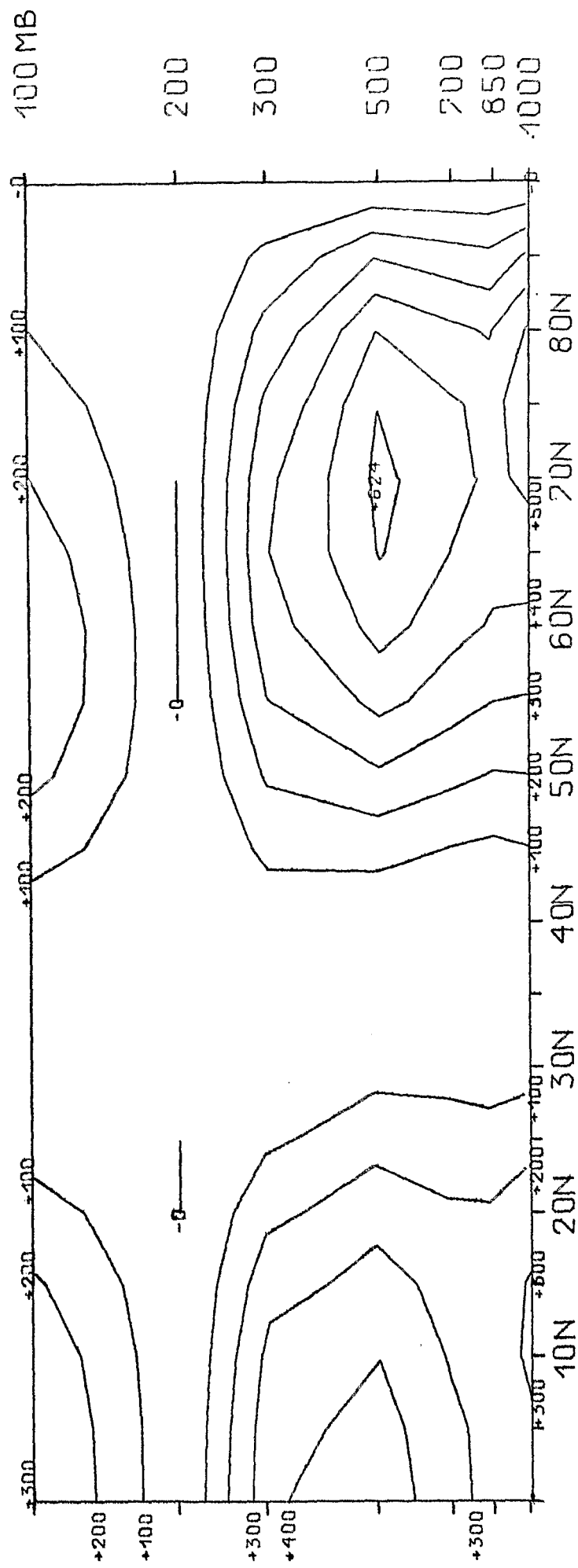
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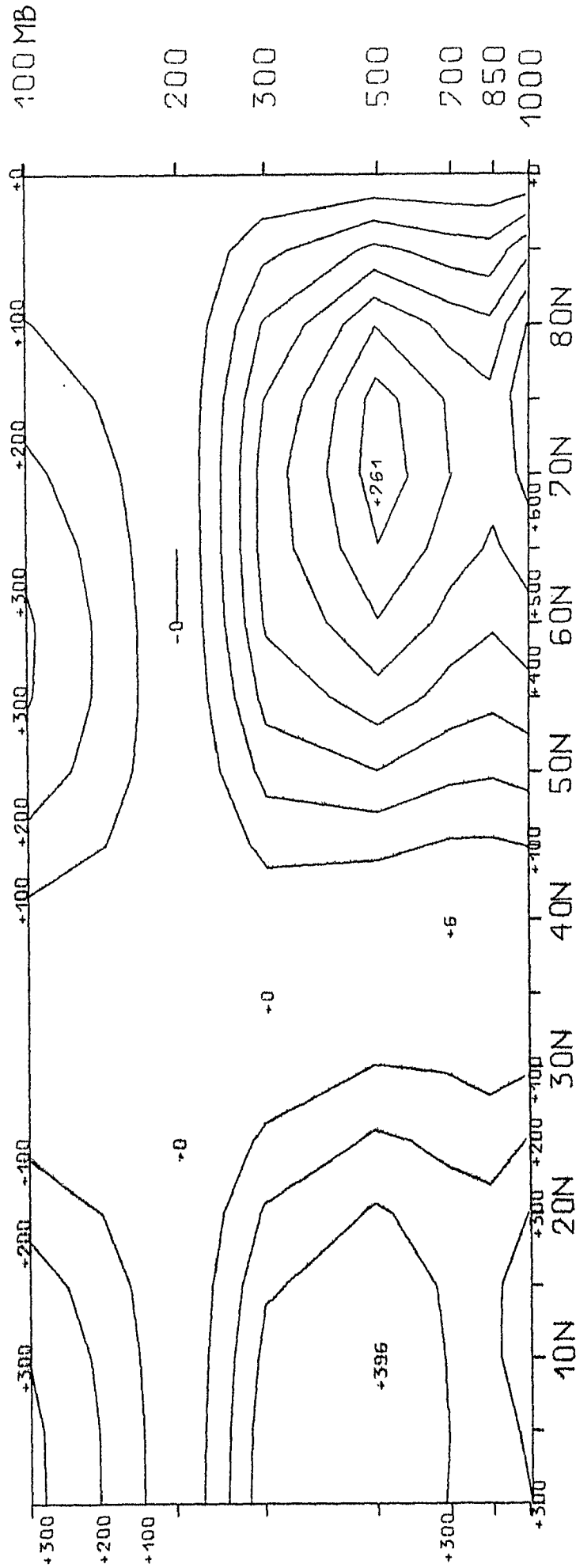
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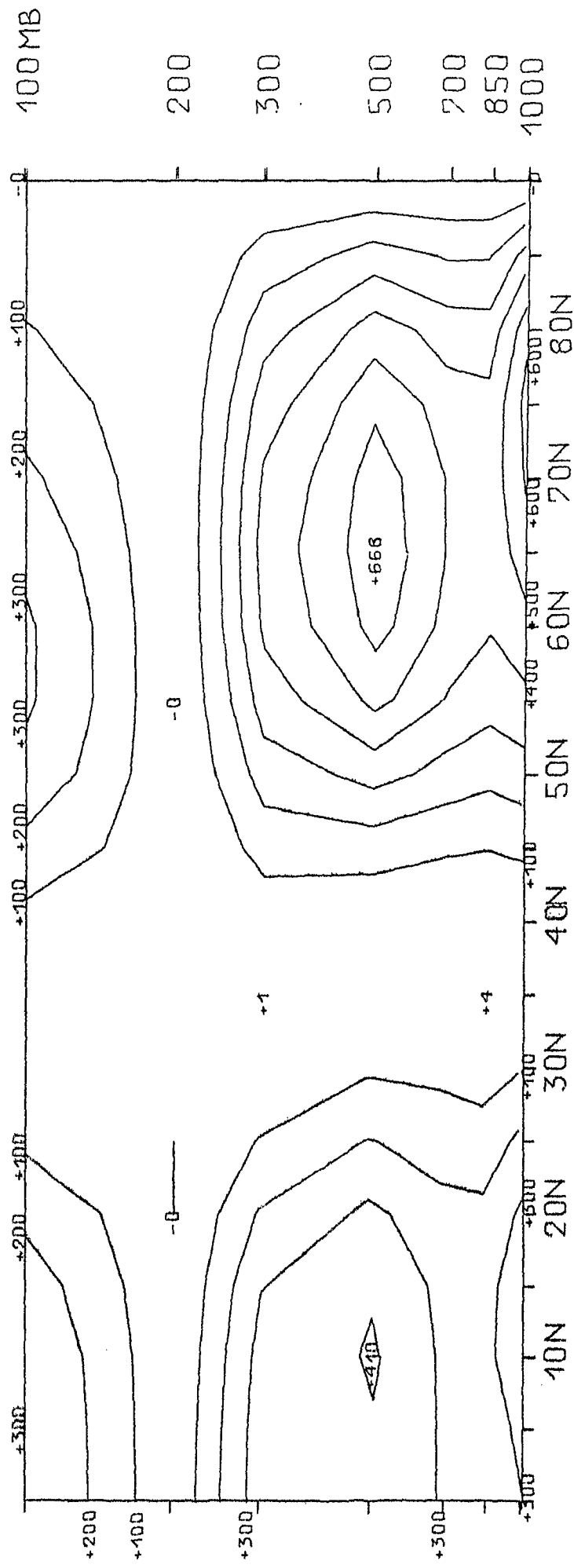
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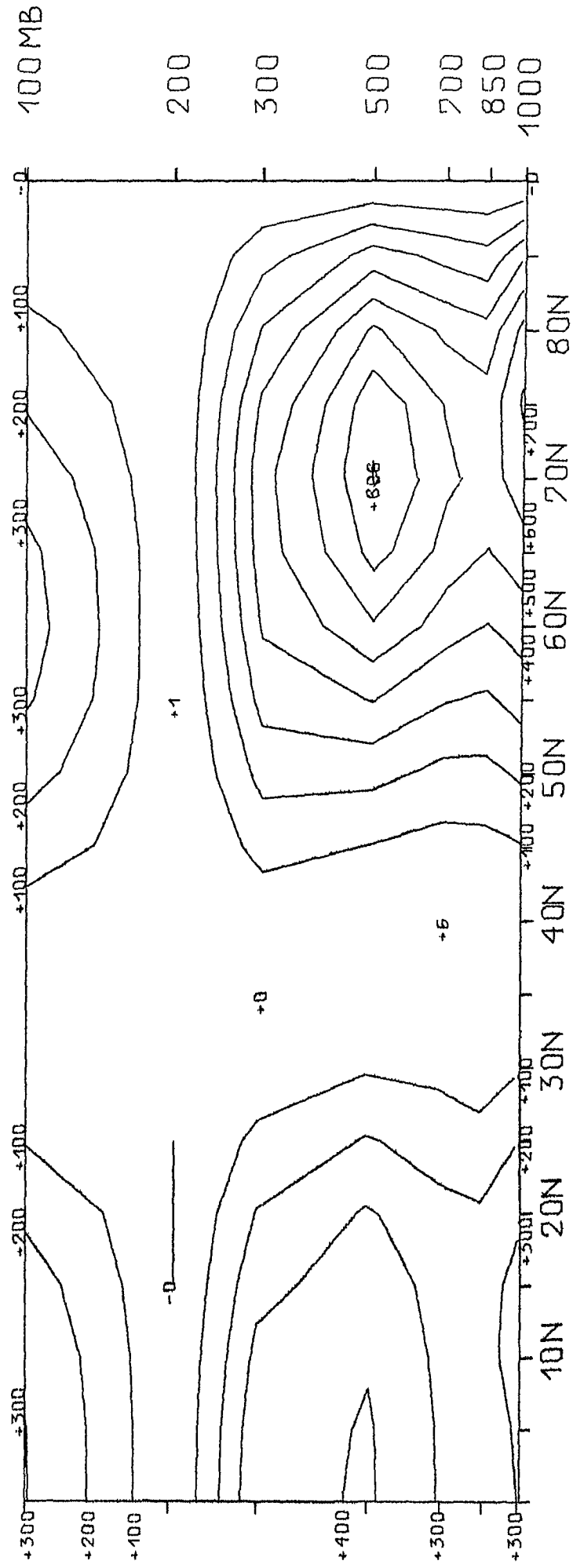
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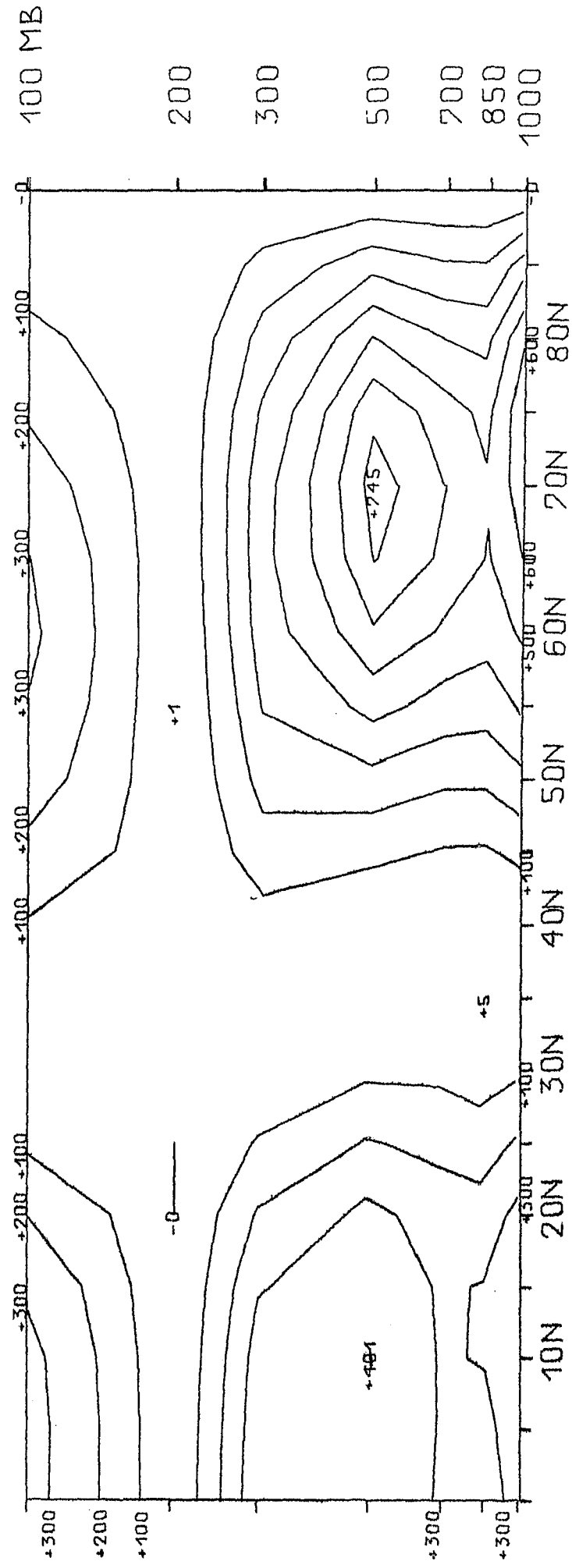
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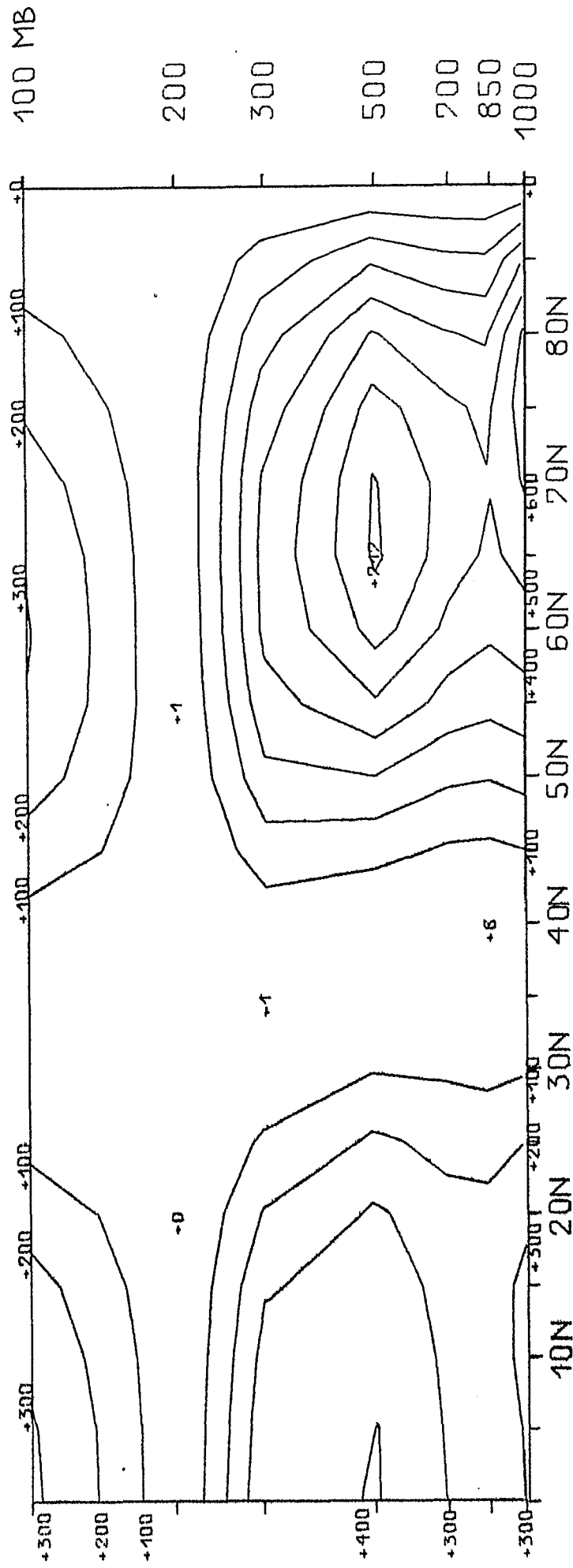
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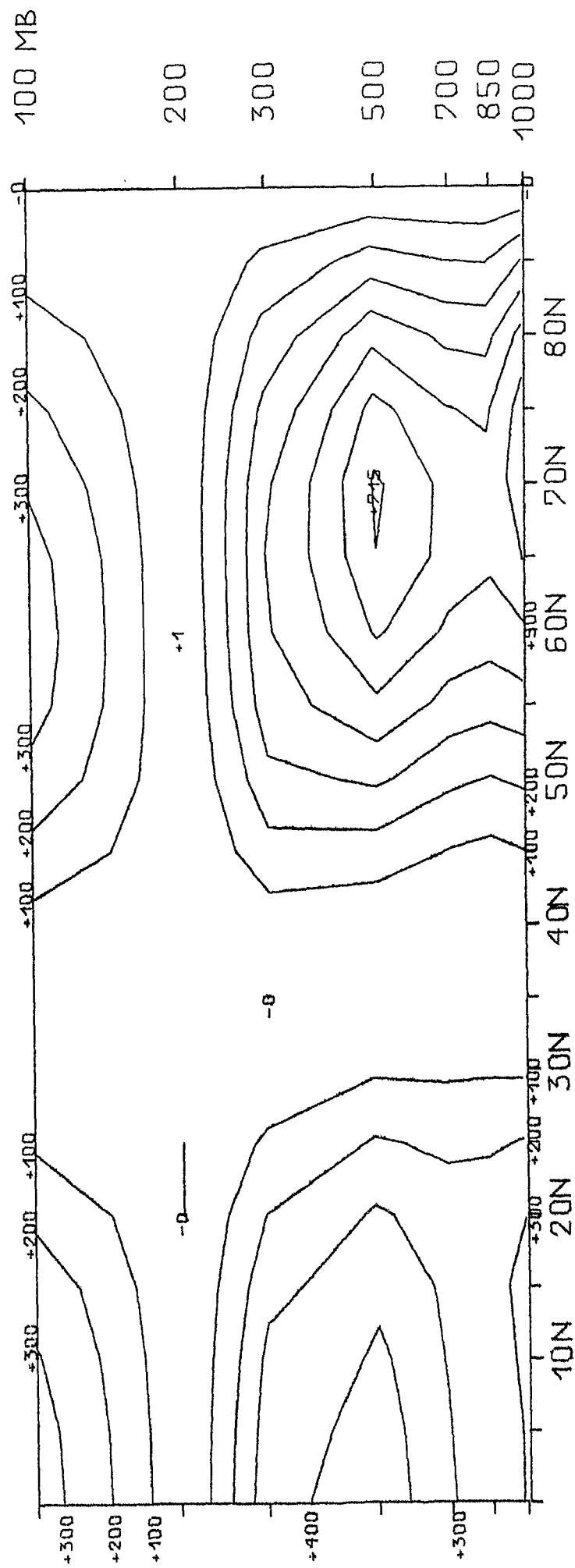
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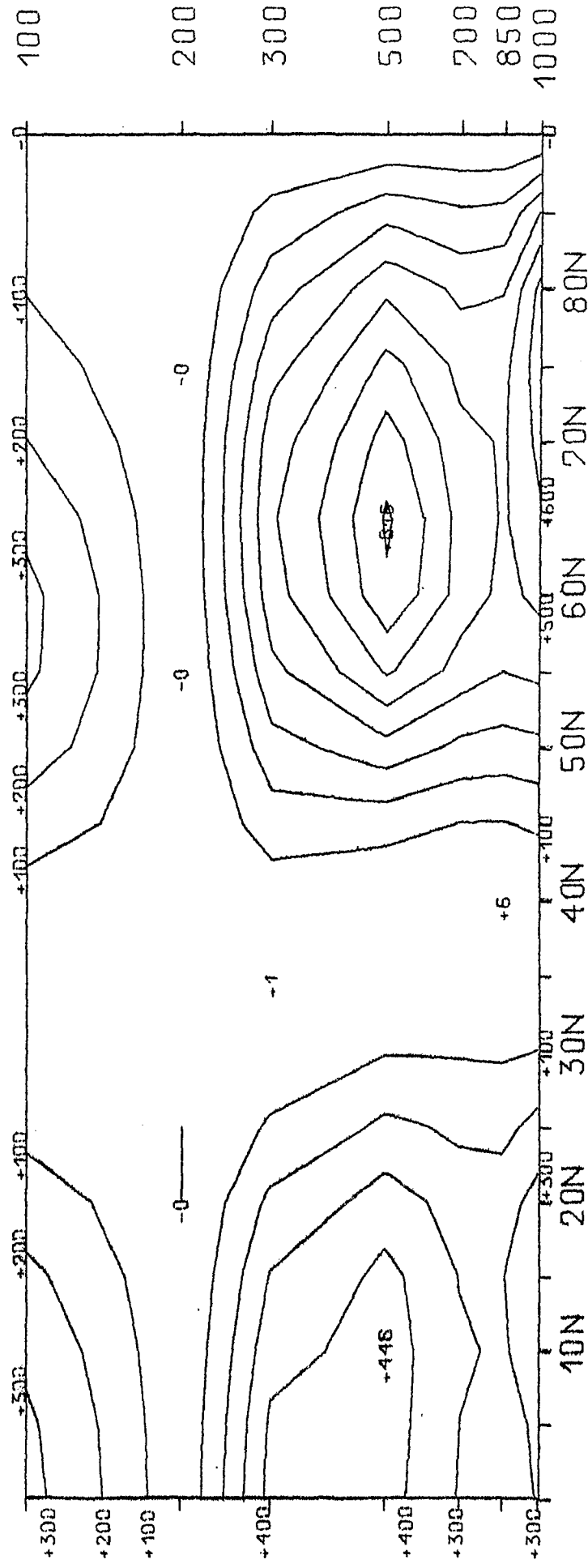
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A_{MMC}

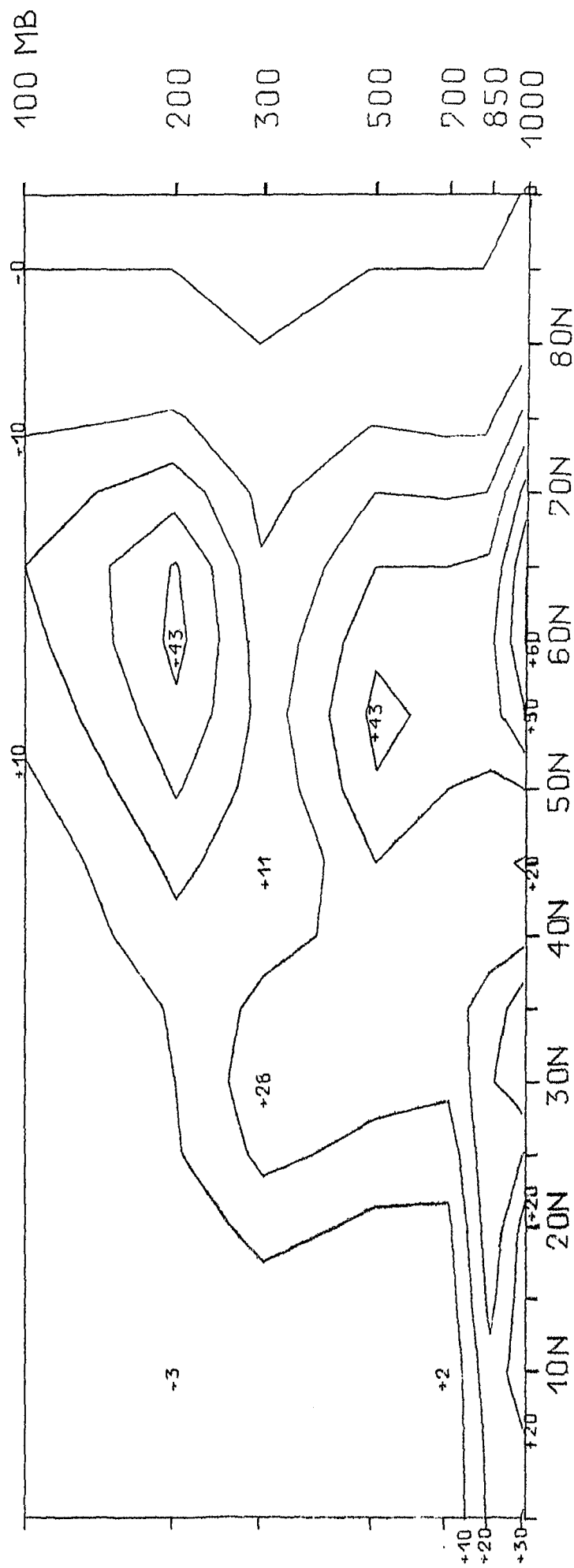
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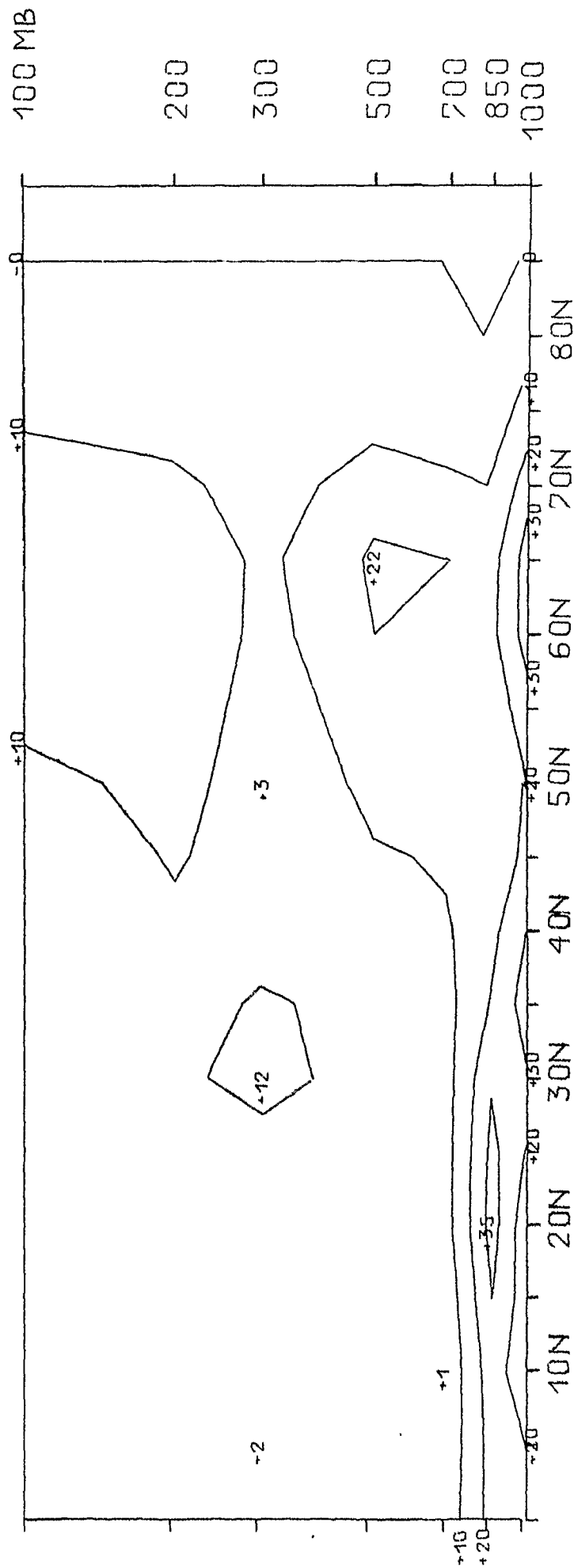
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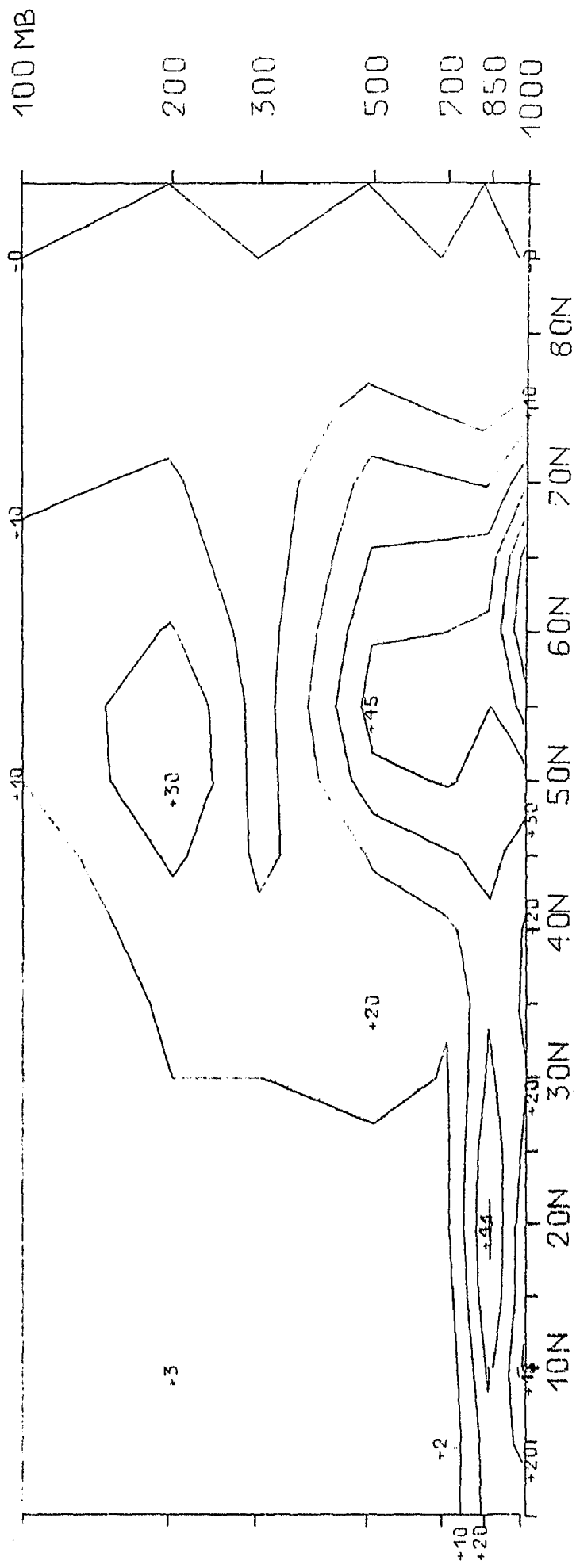
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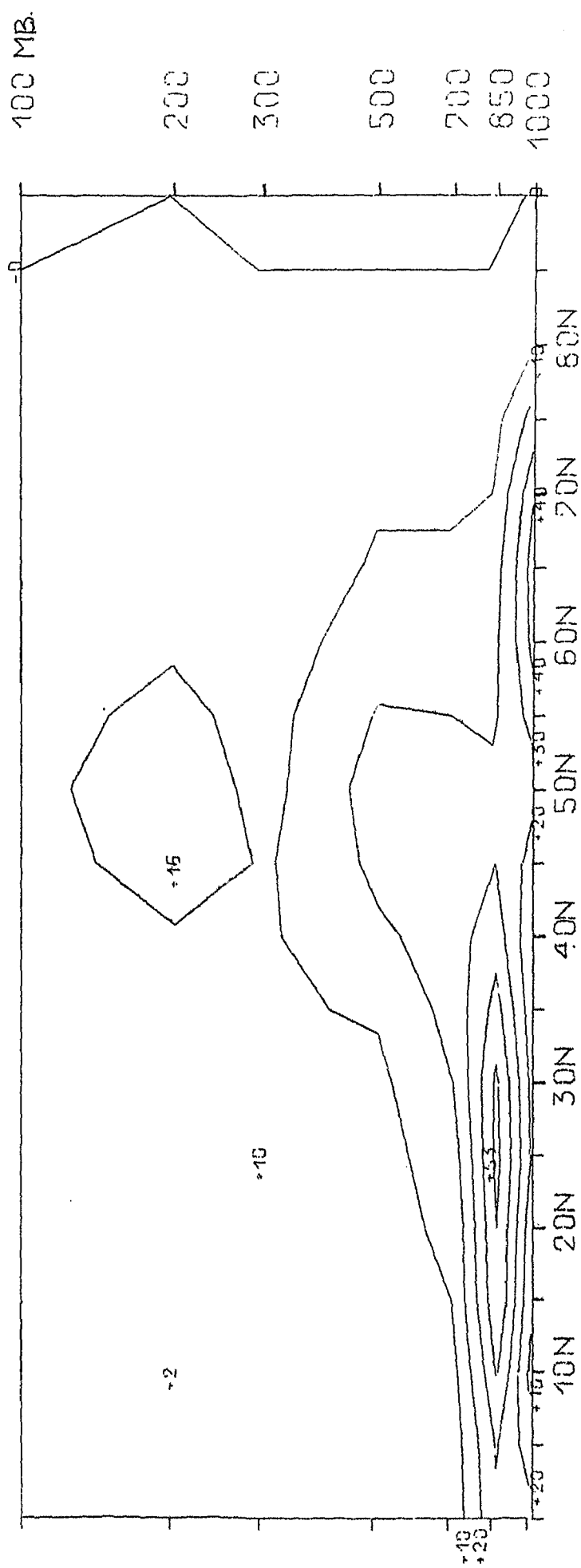
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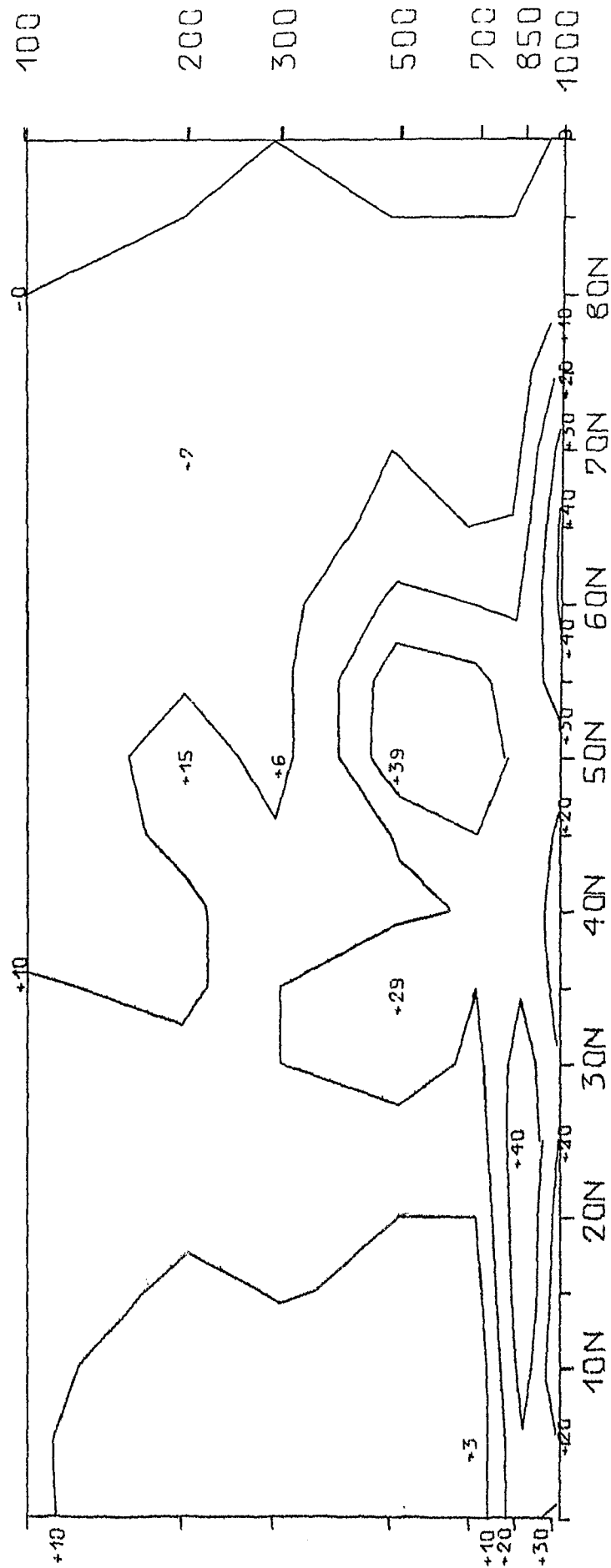
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KENNEDY, 36047000



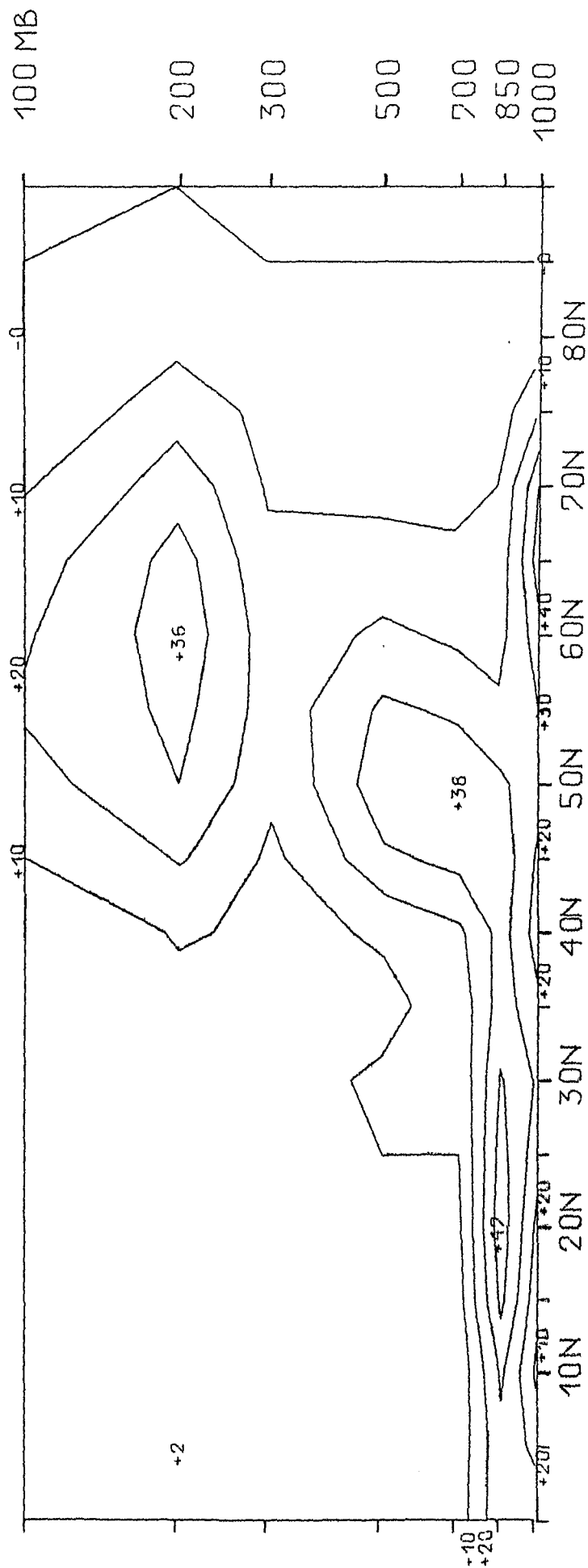
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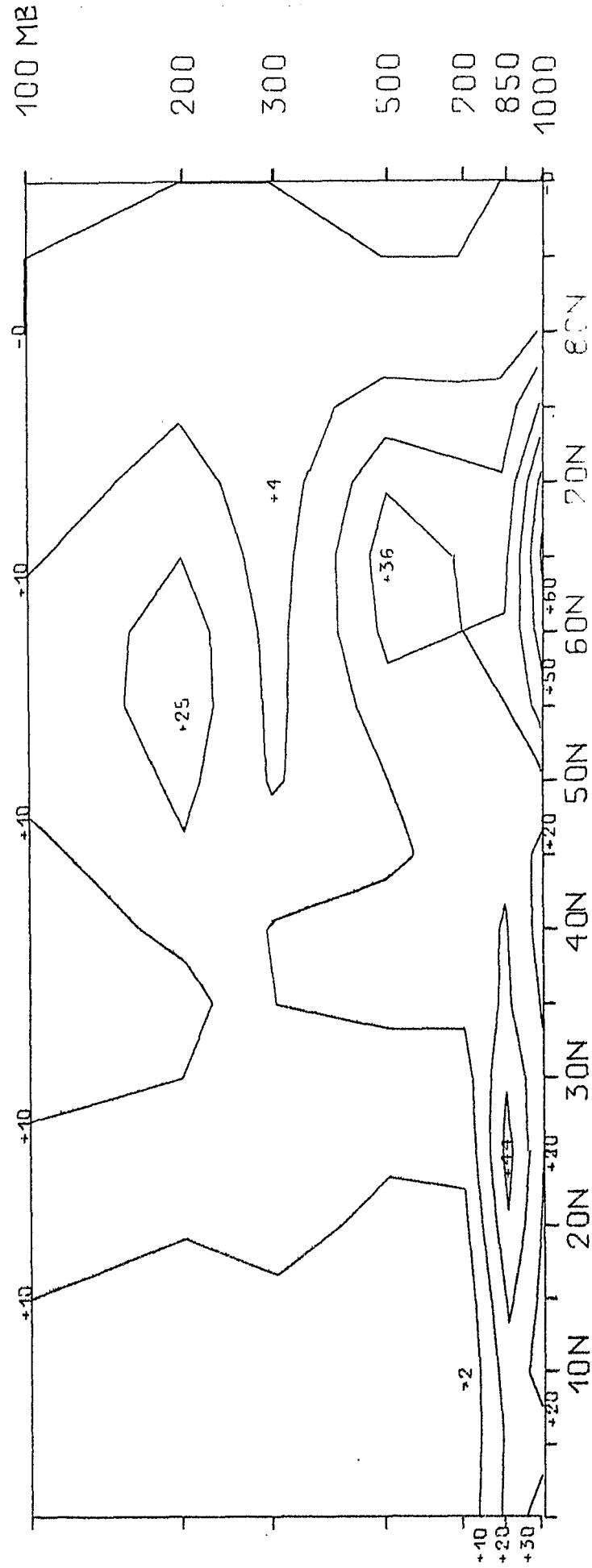
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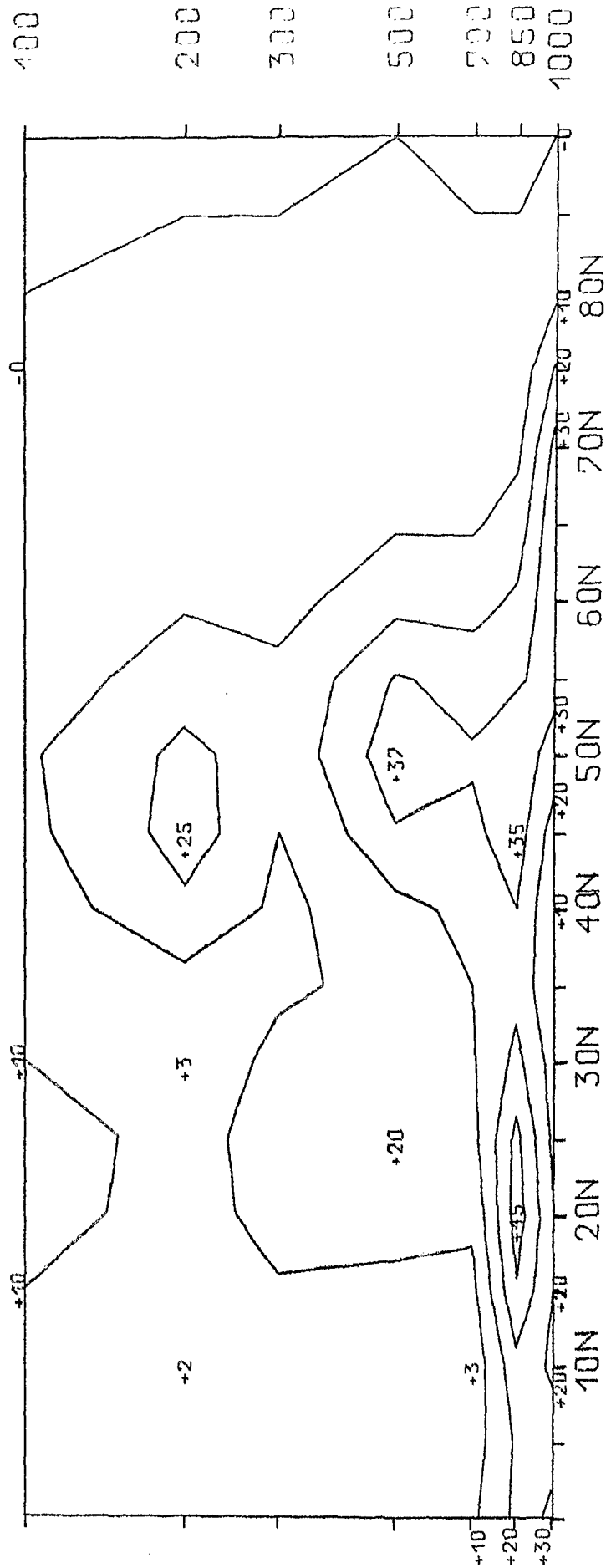
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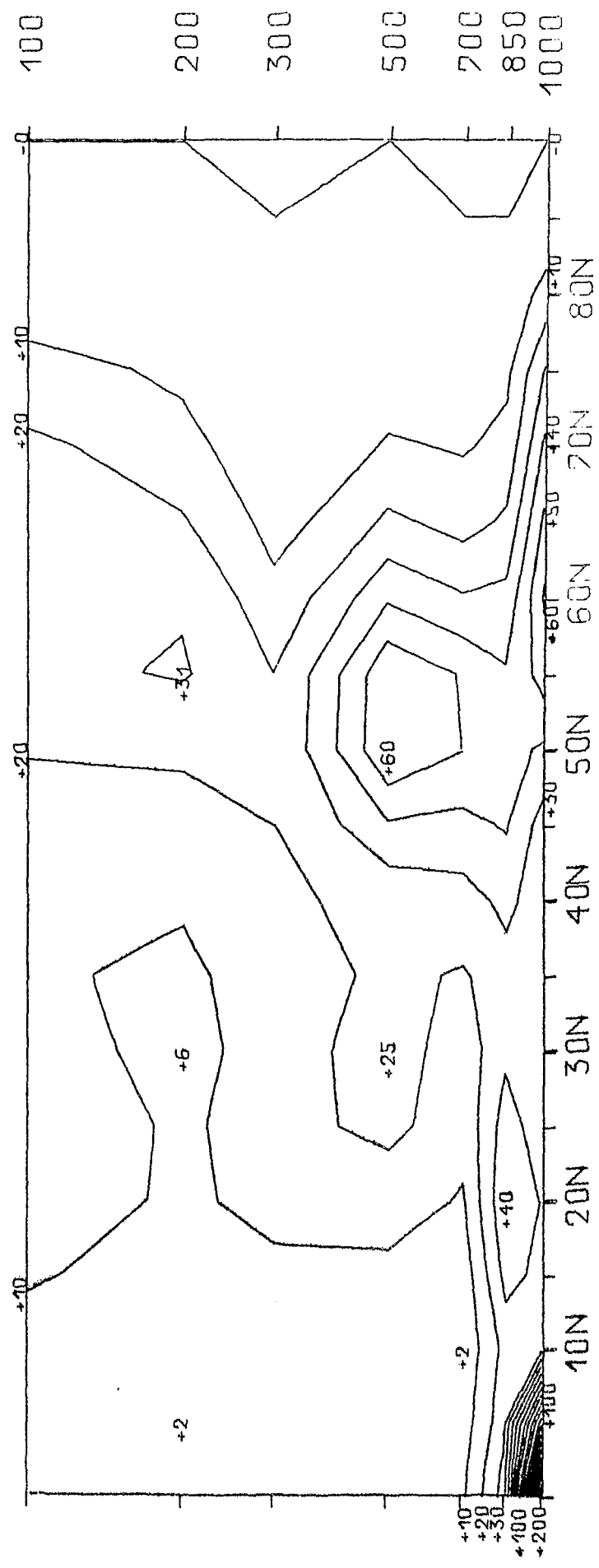
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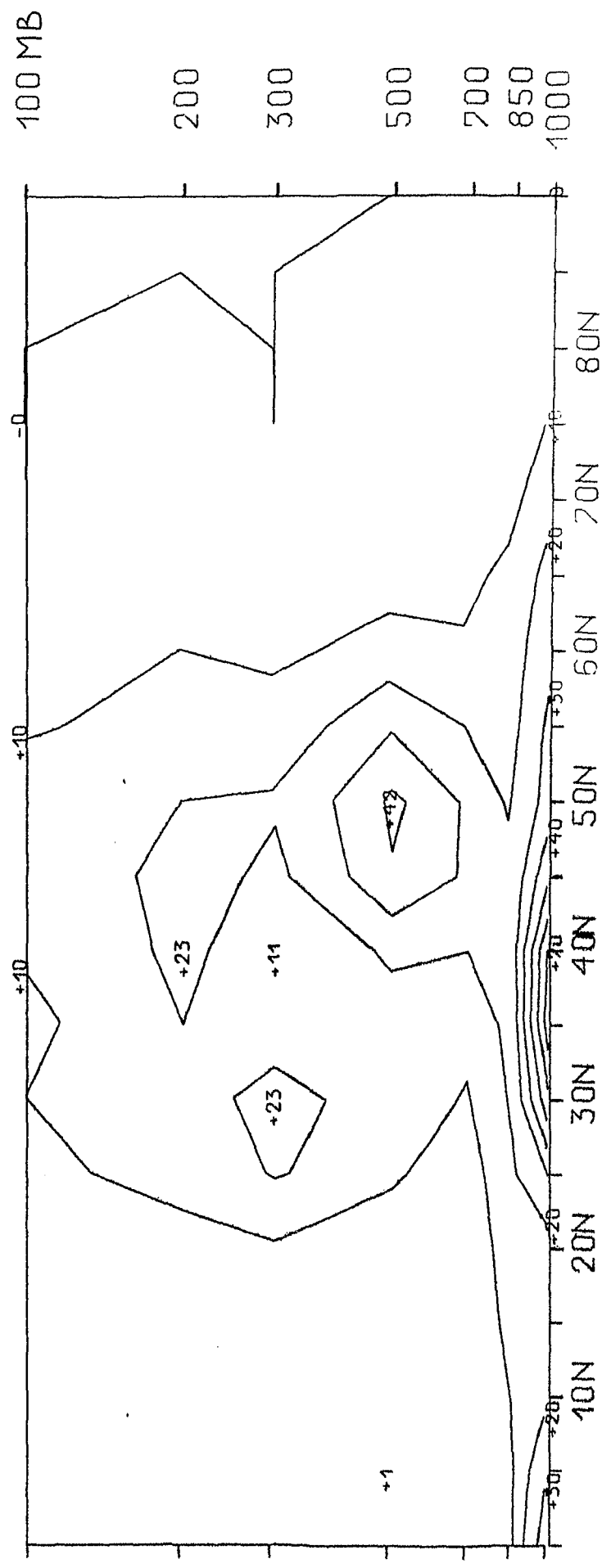
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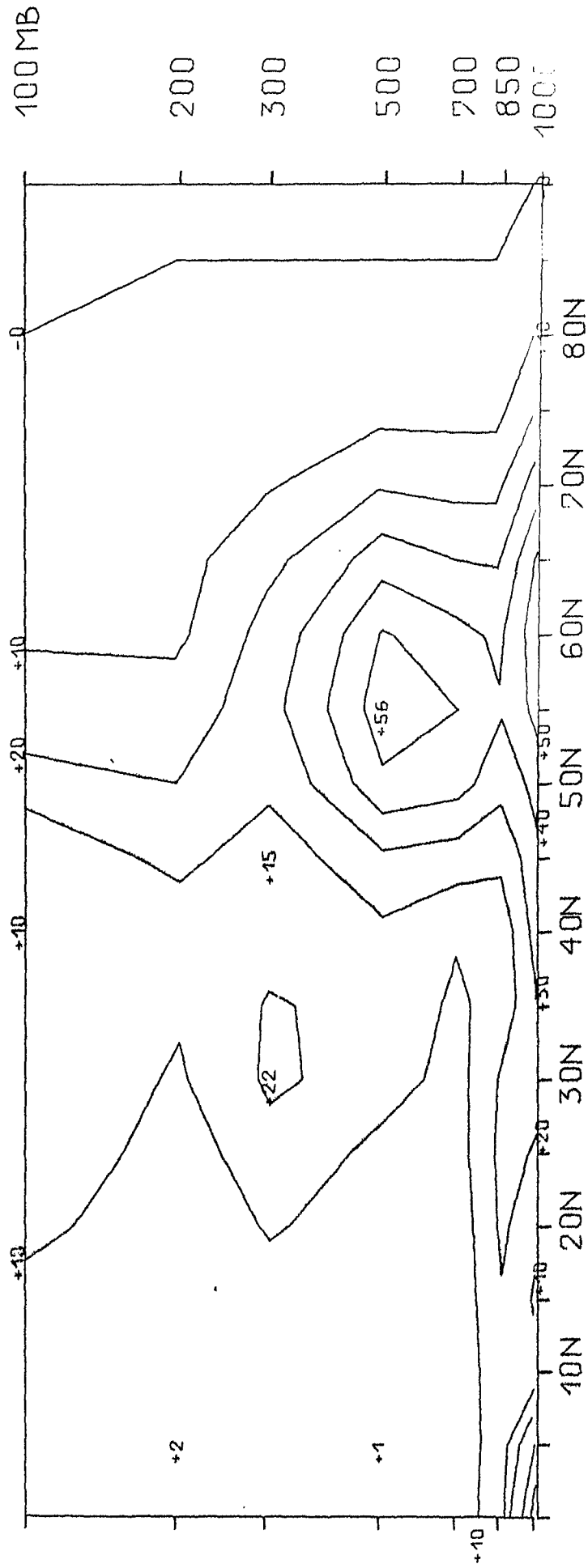
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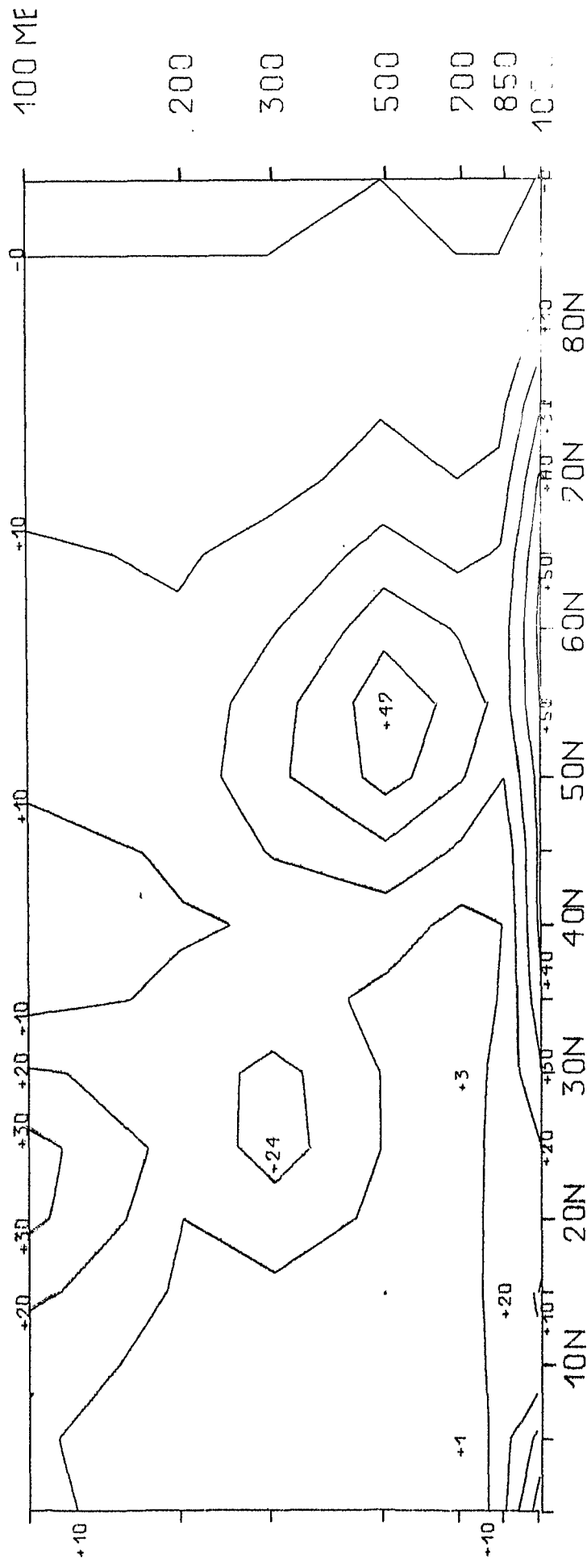
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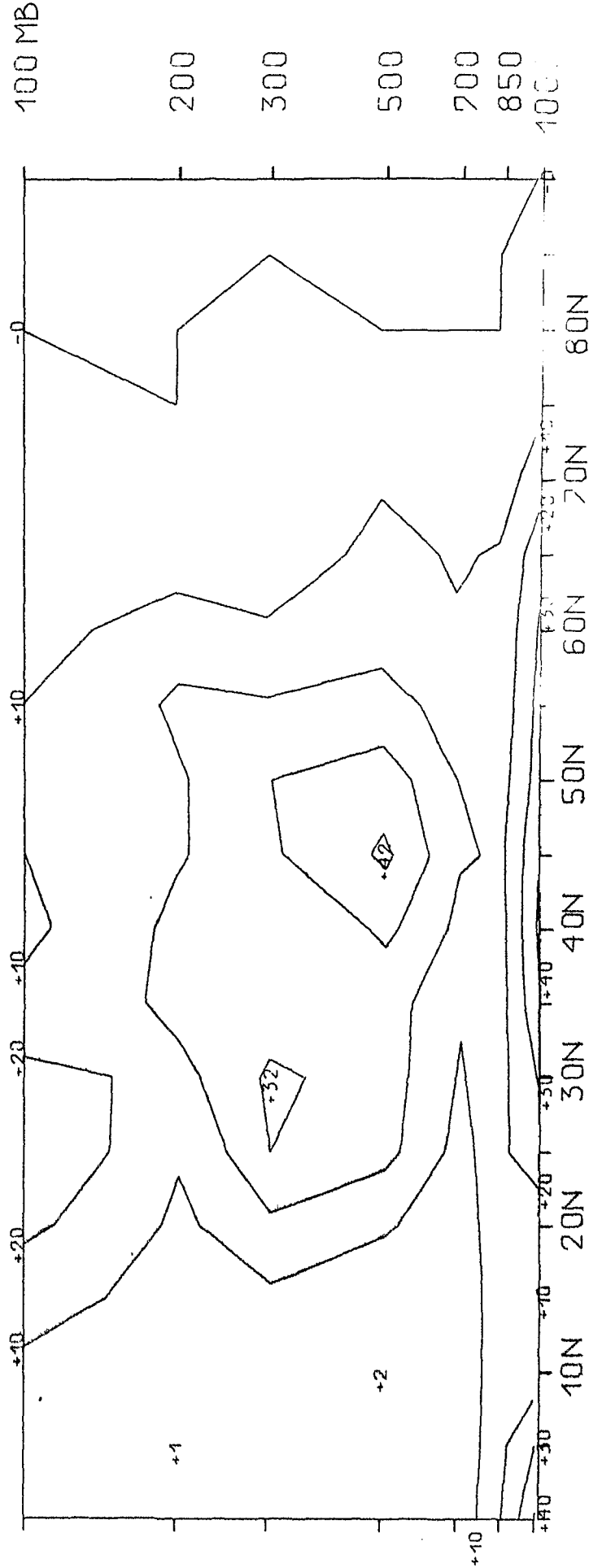
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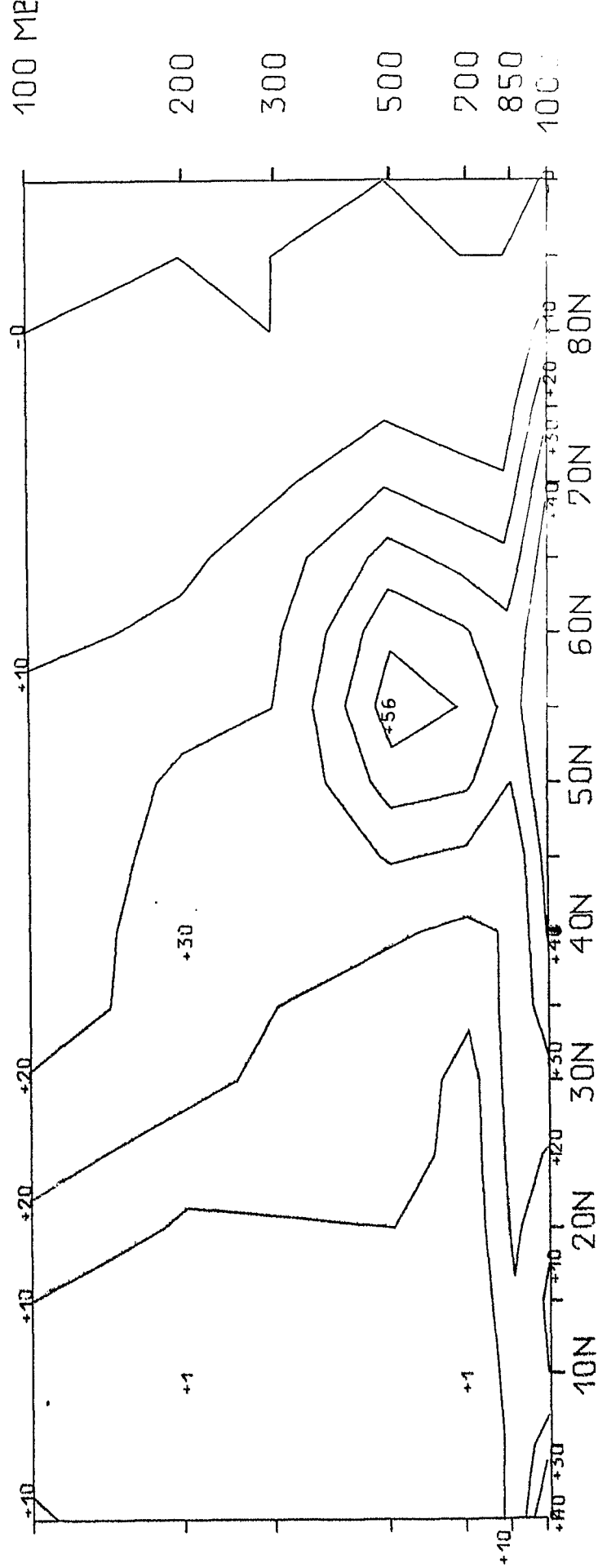
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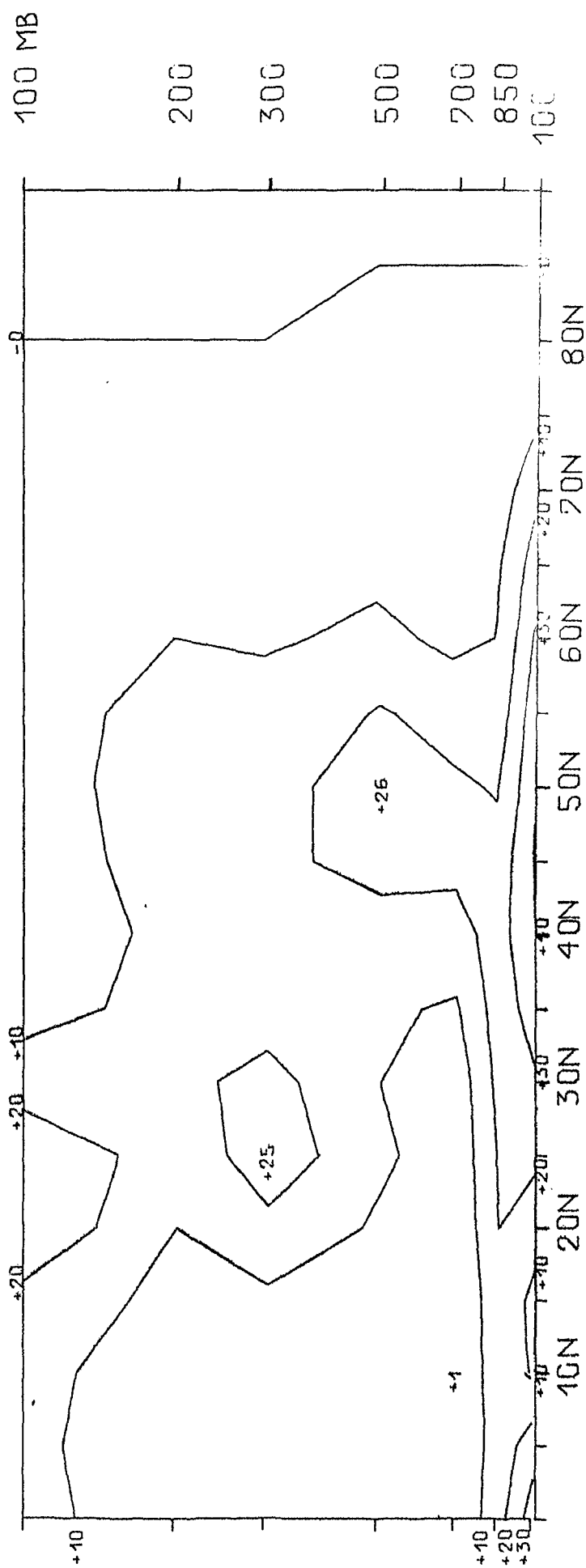
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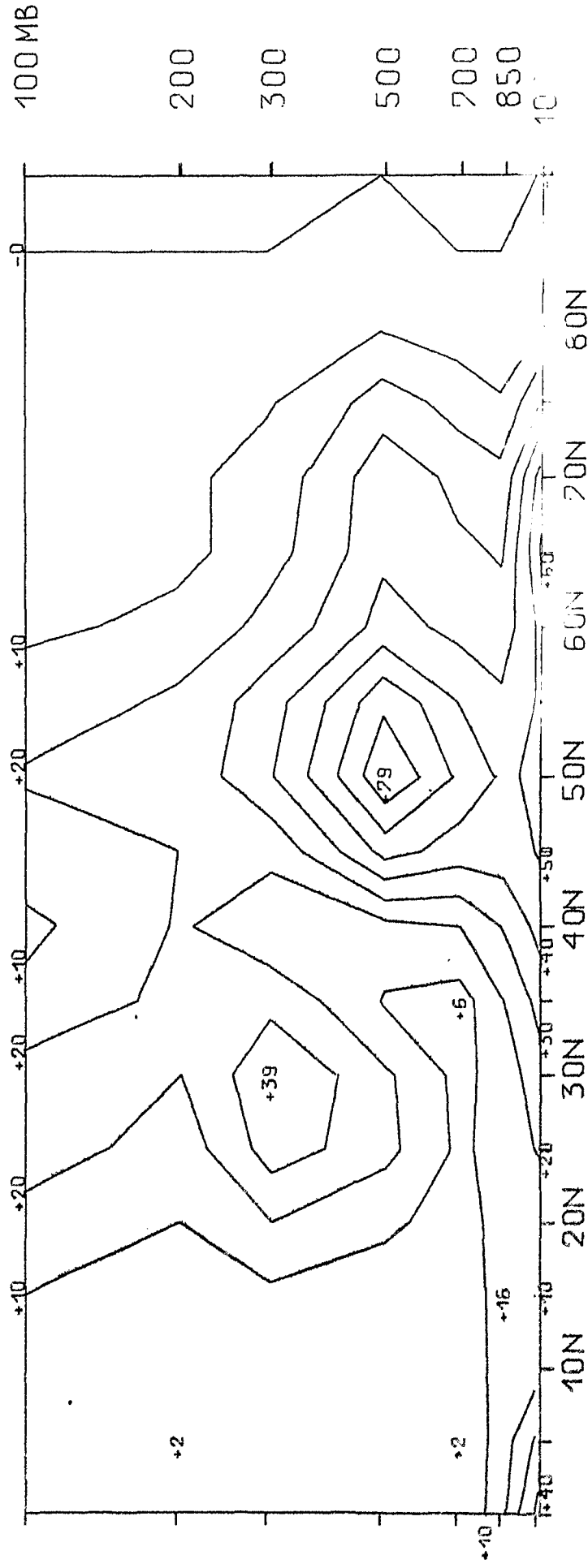
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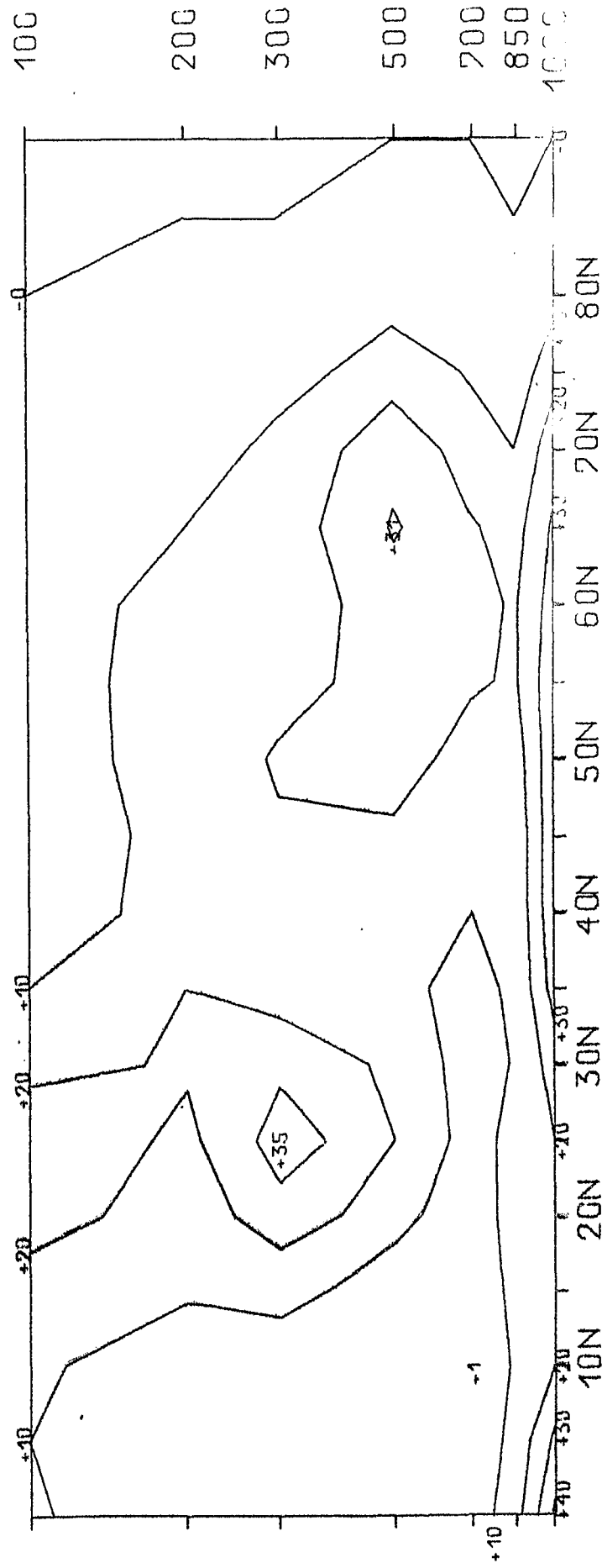
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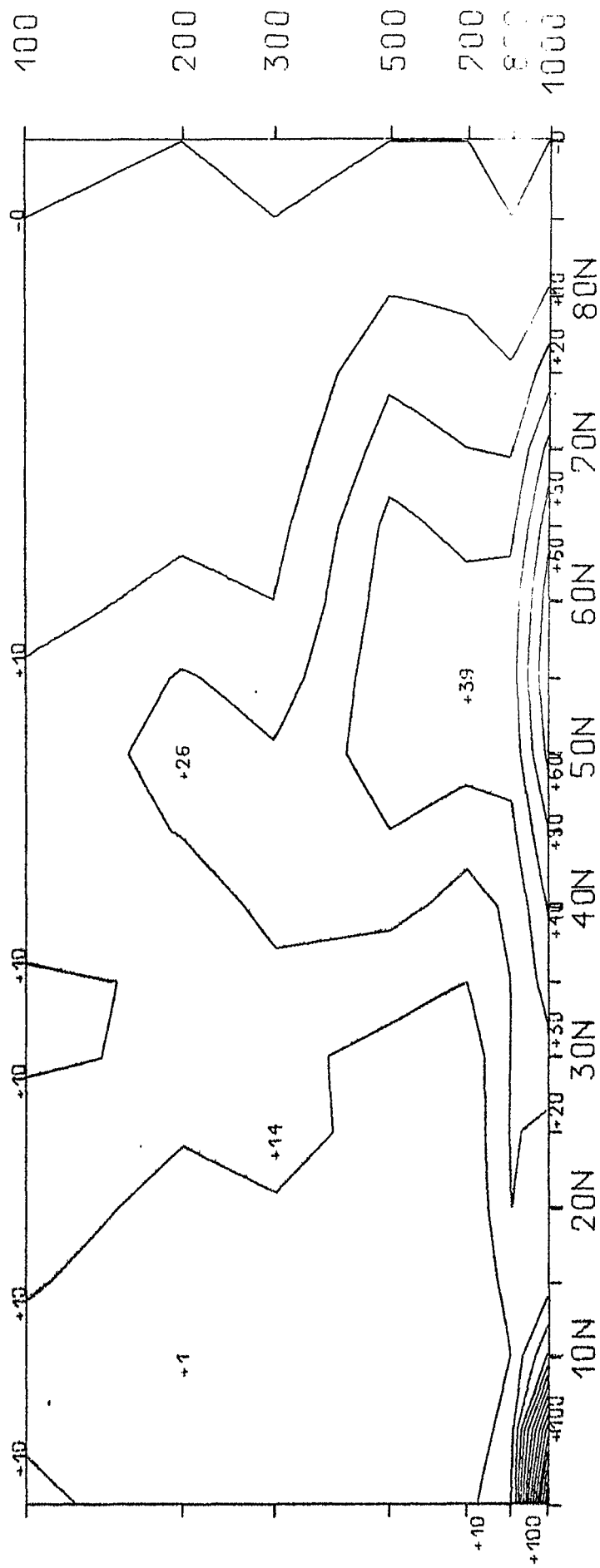
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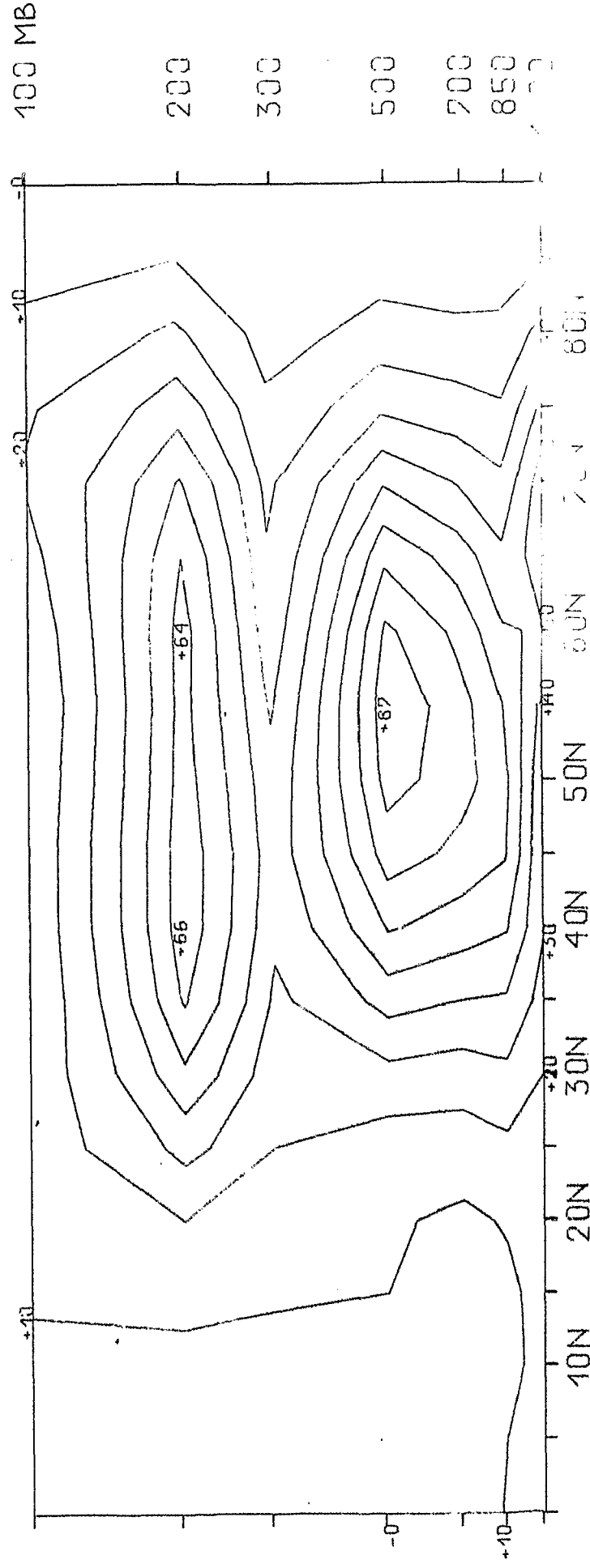
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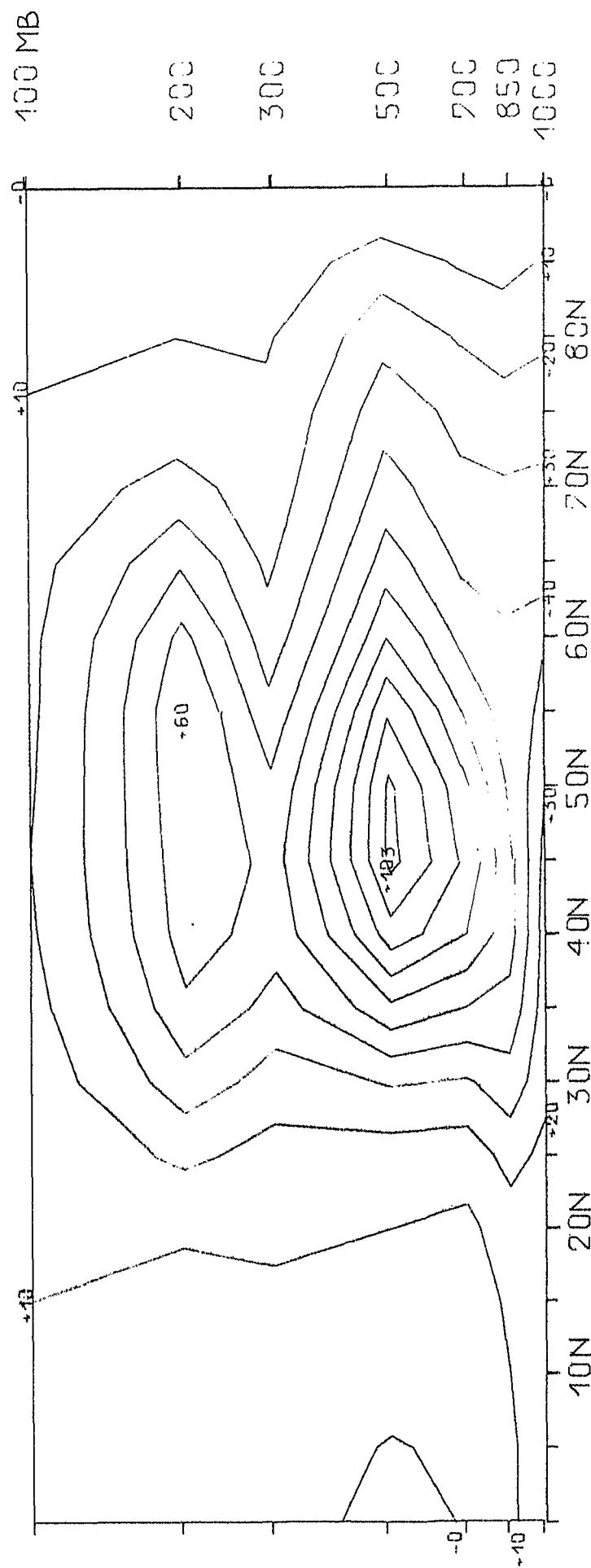
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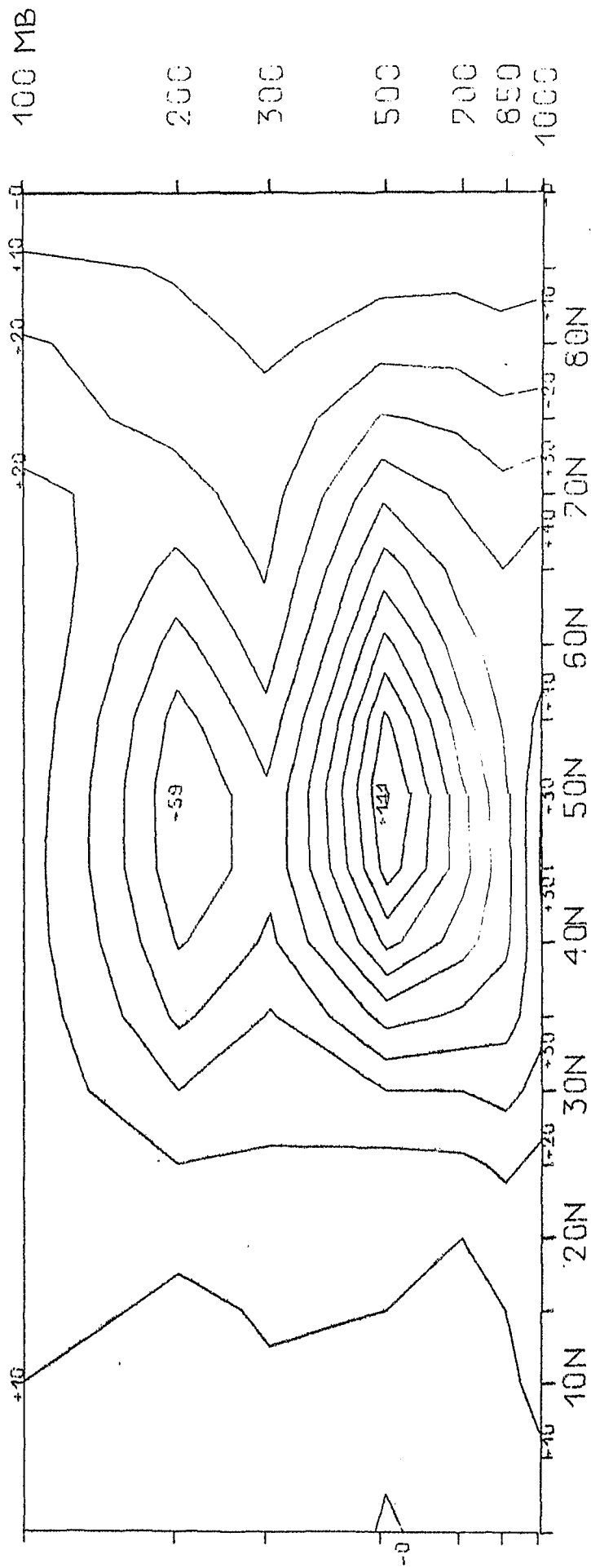
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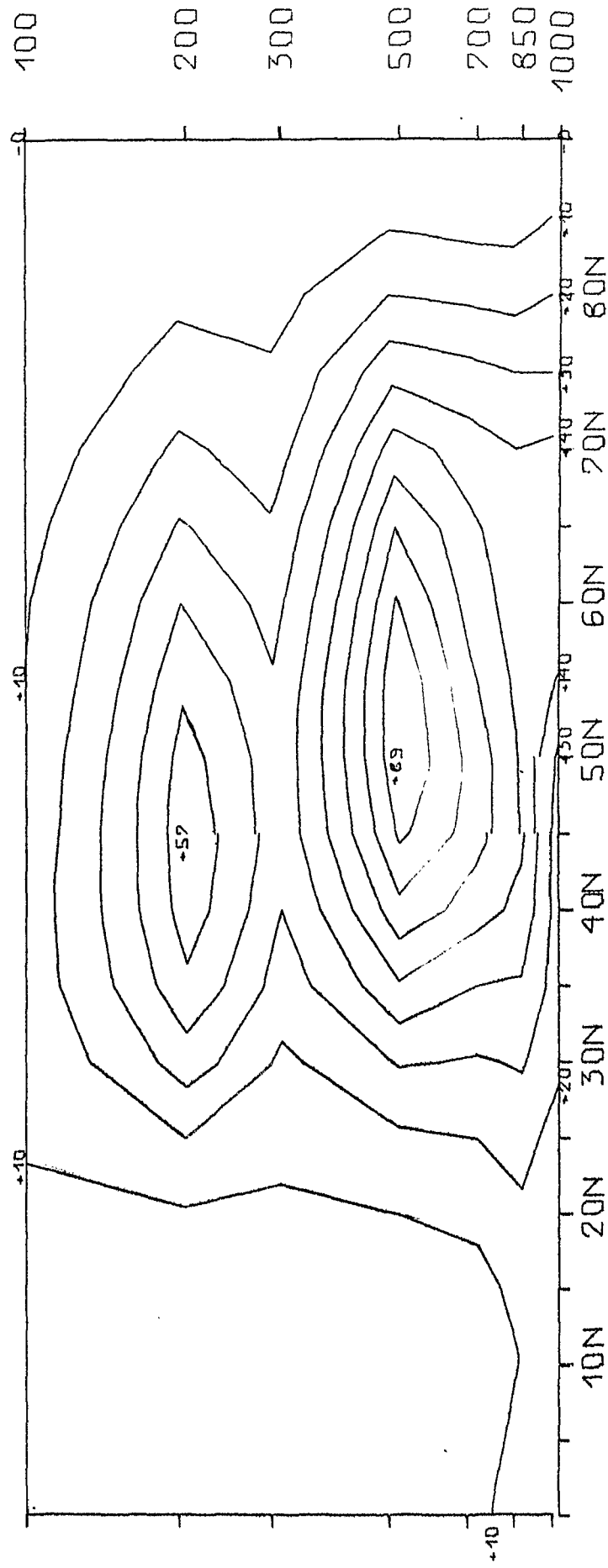
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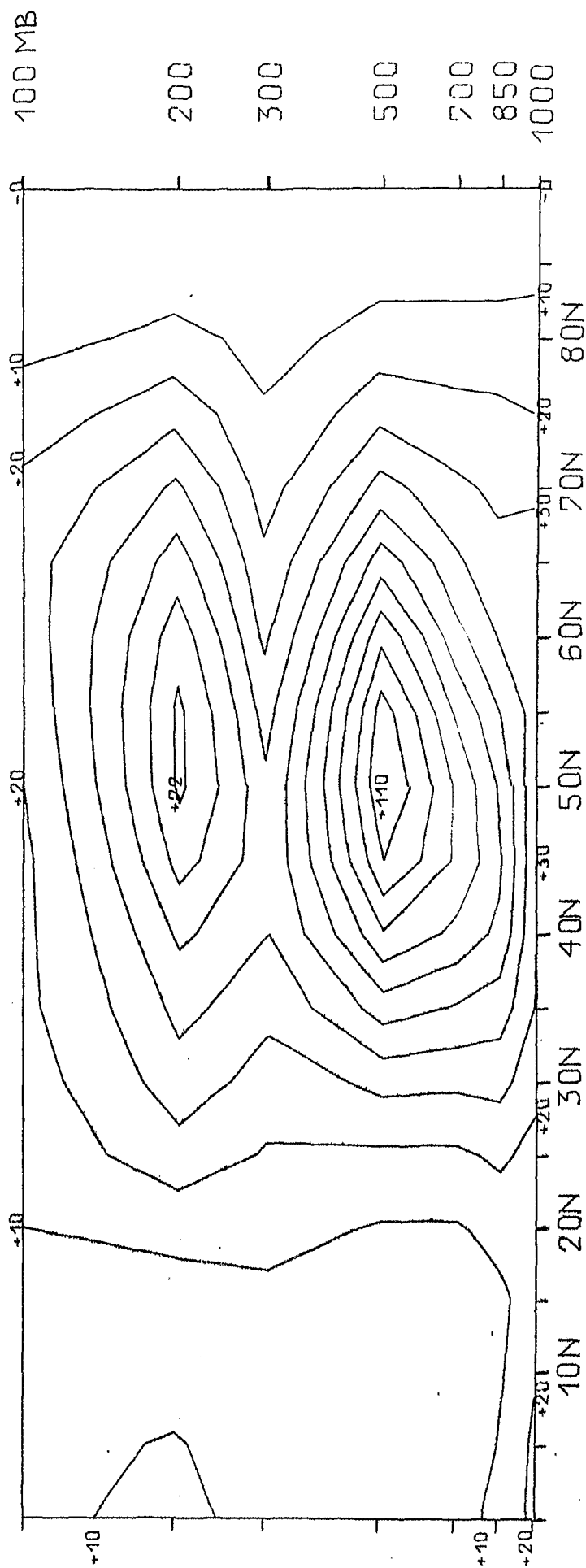
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A_{TE} 10⁻³ J CM⁻² MB⁻¹ APRIL 71

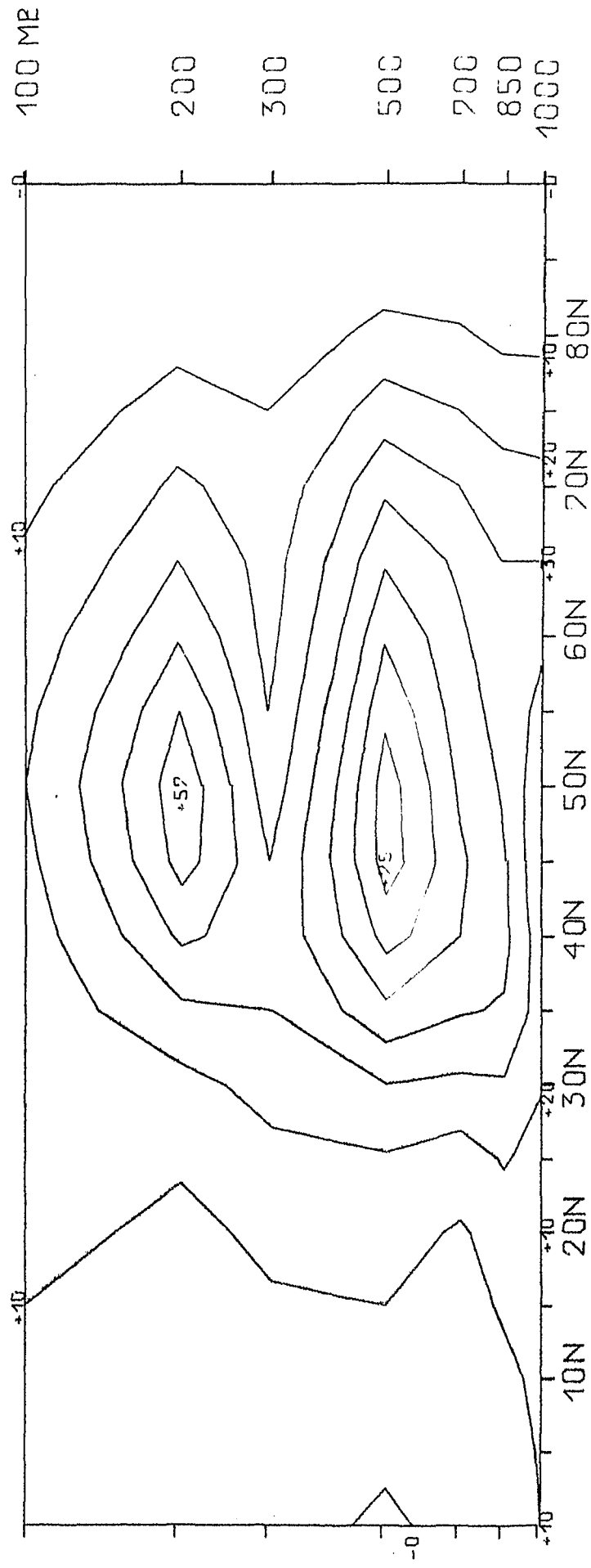
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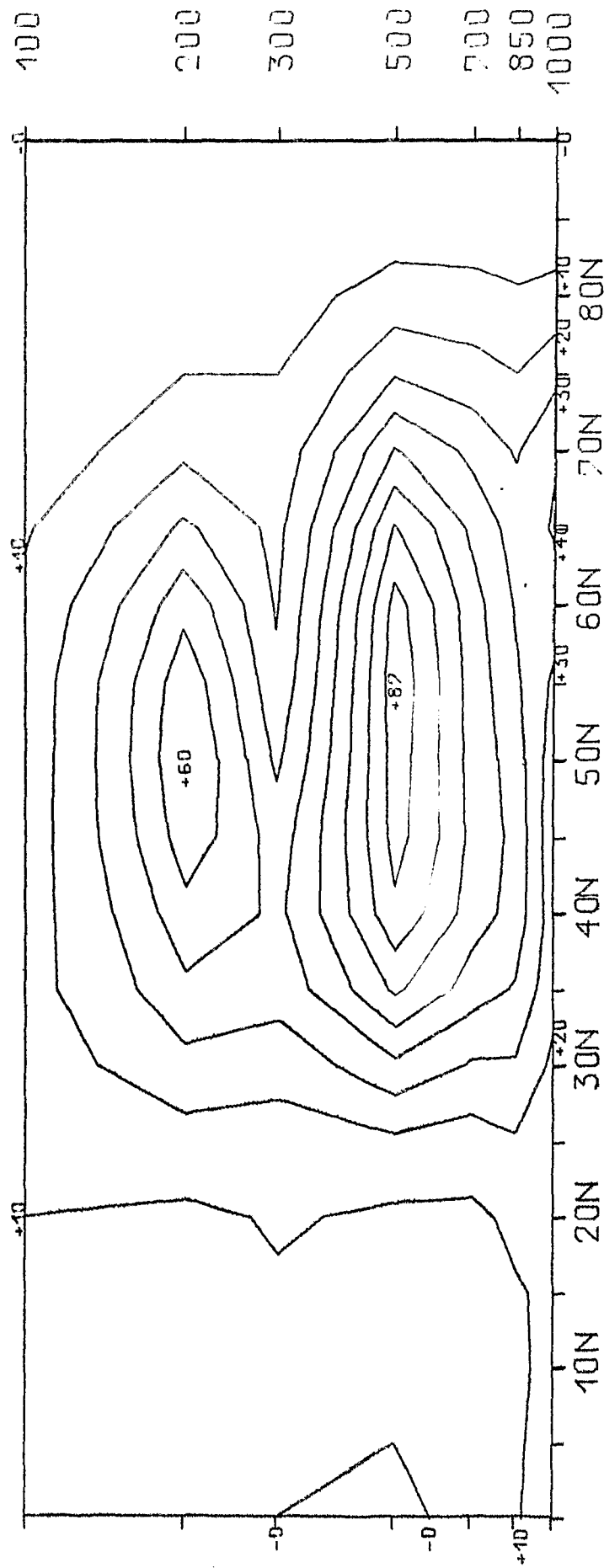
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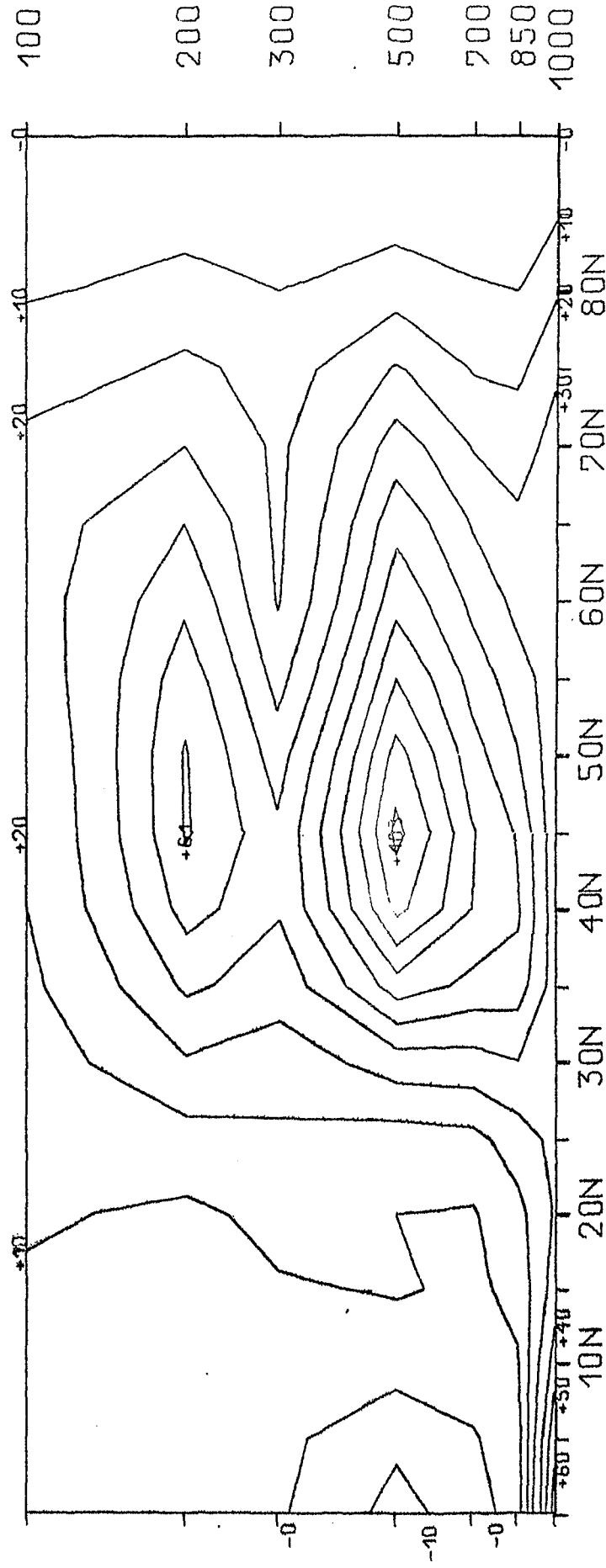
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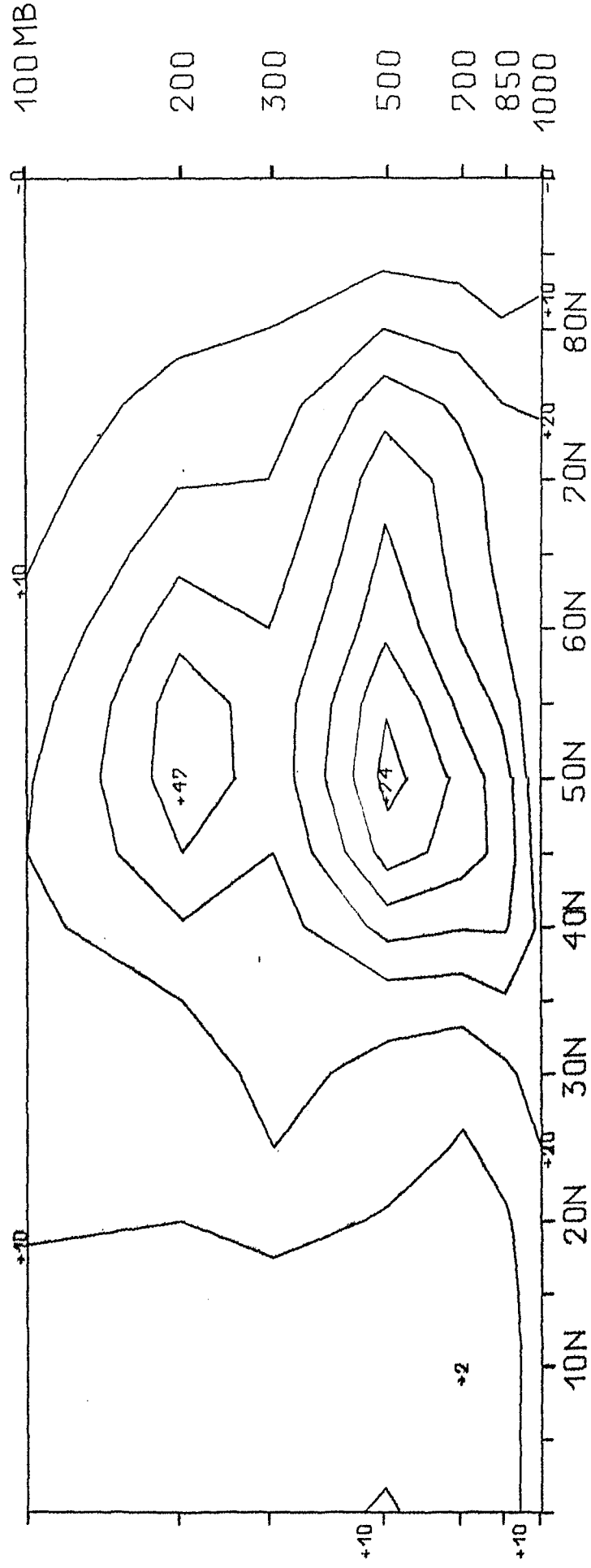
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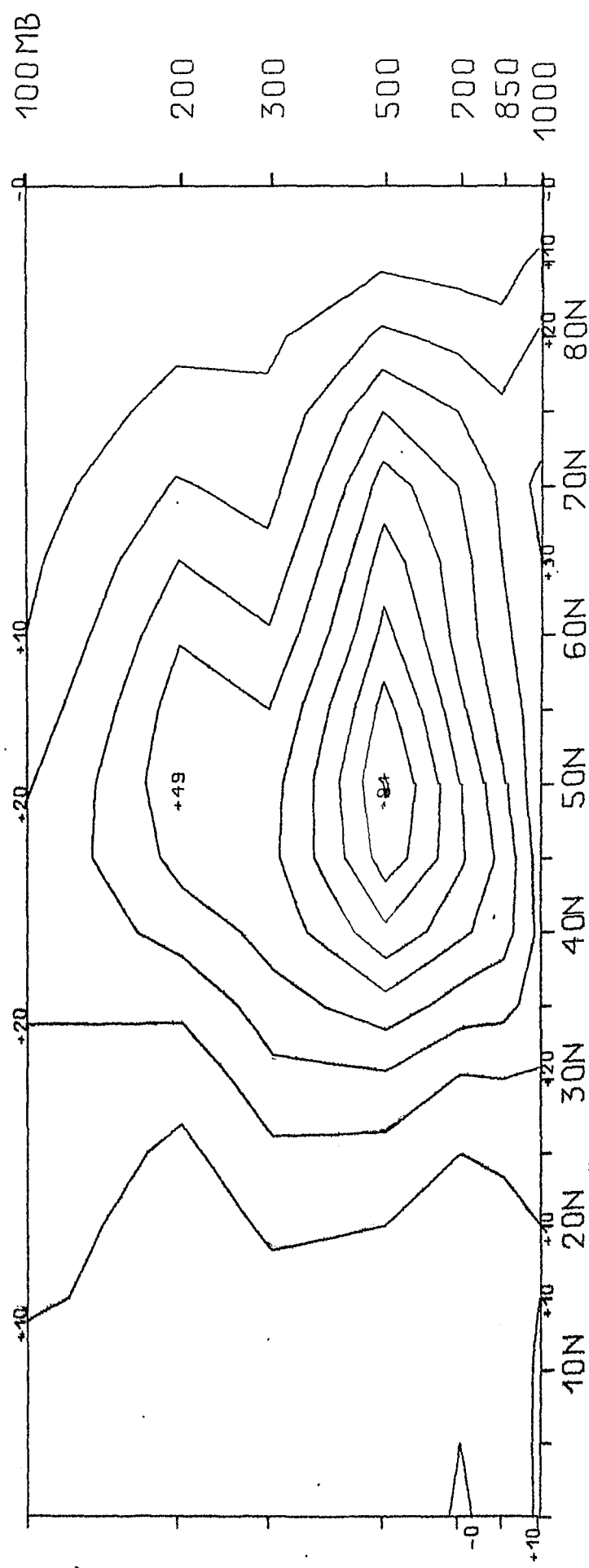
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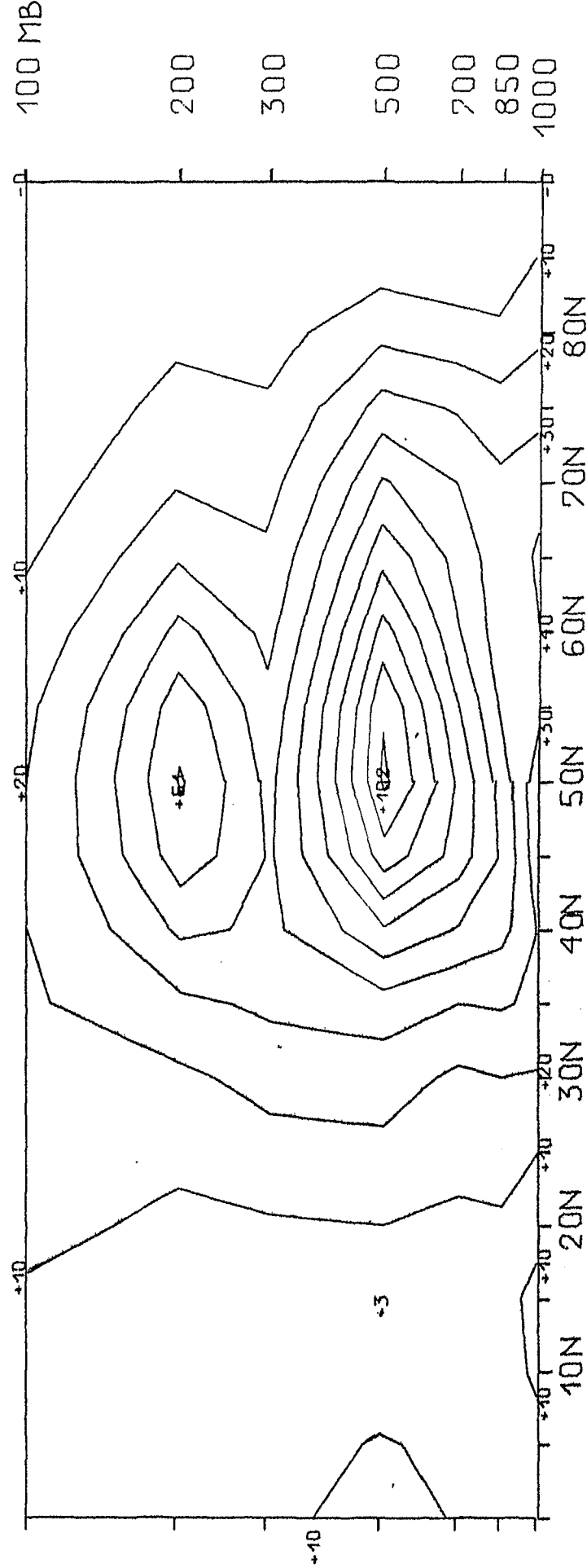
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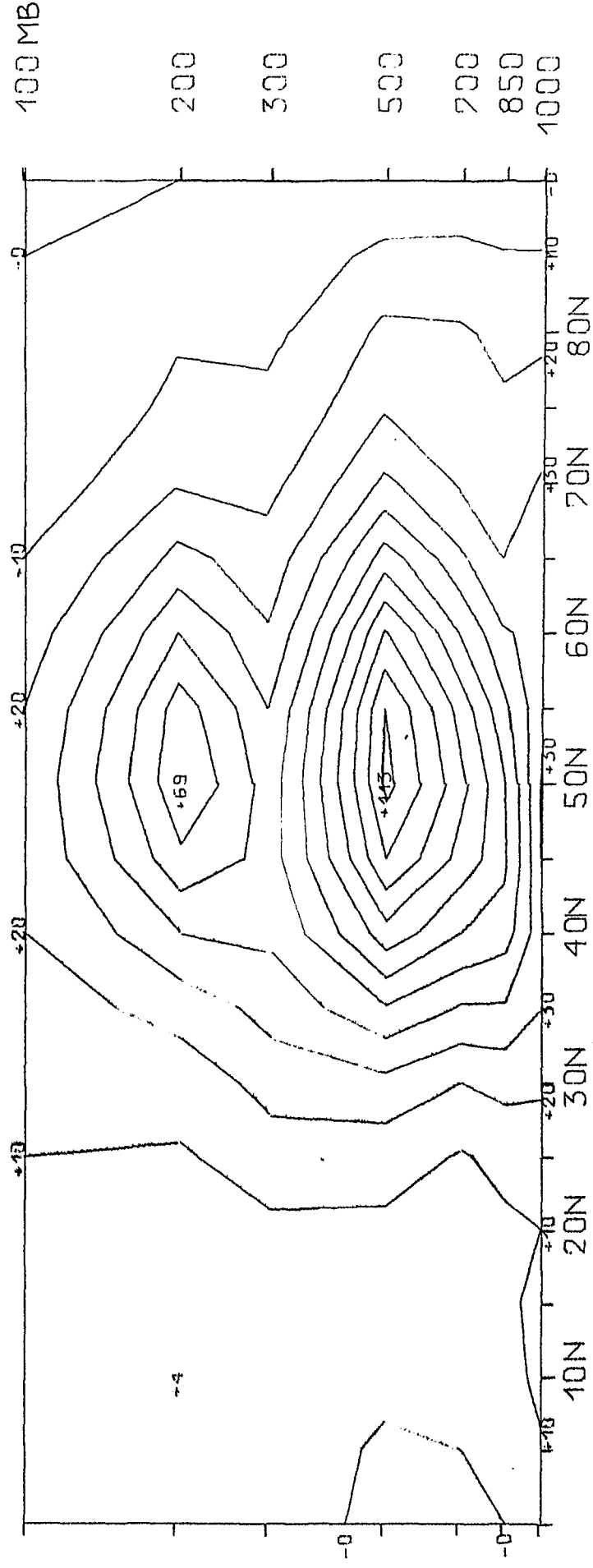
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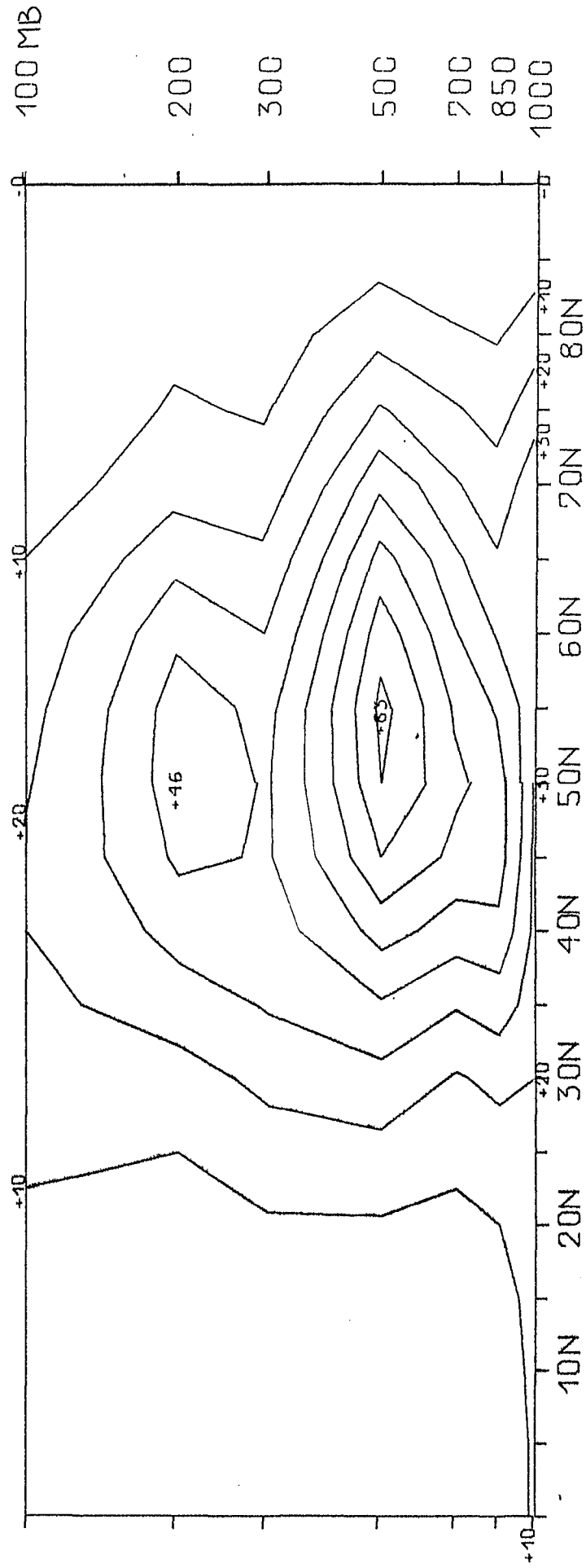
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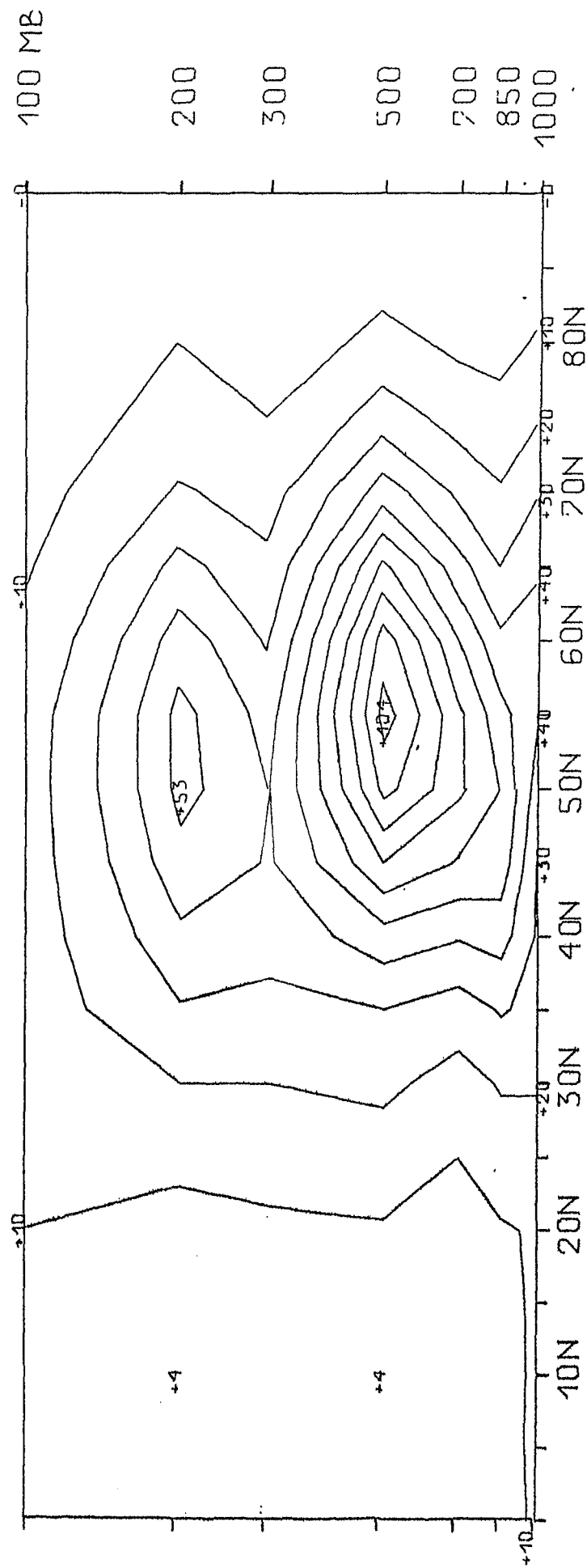
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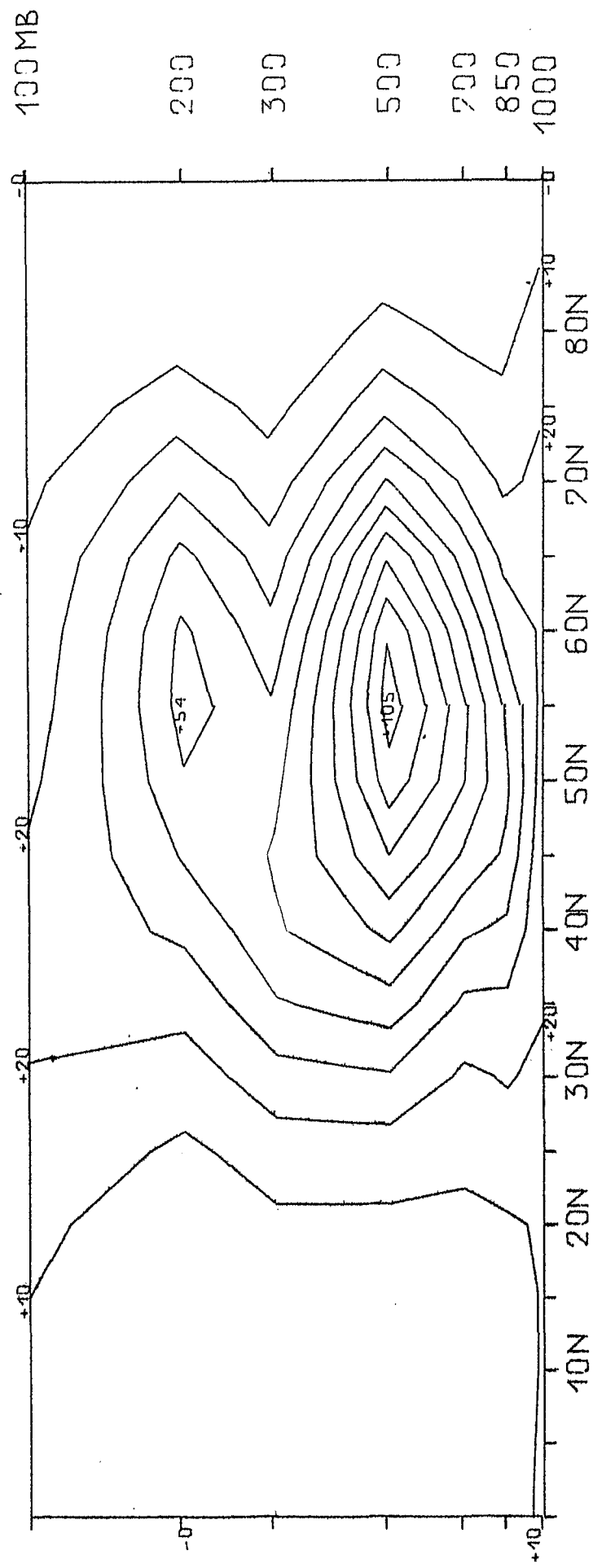
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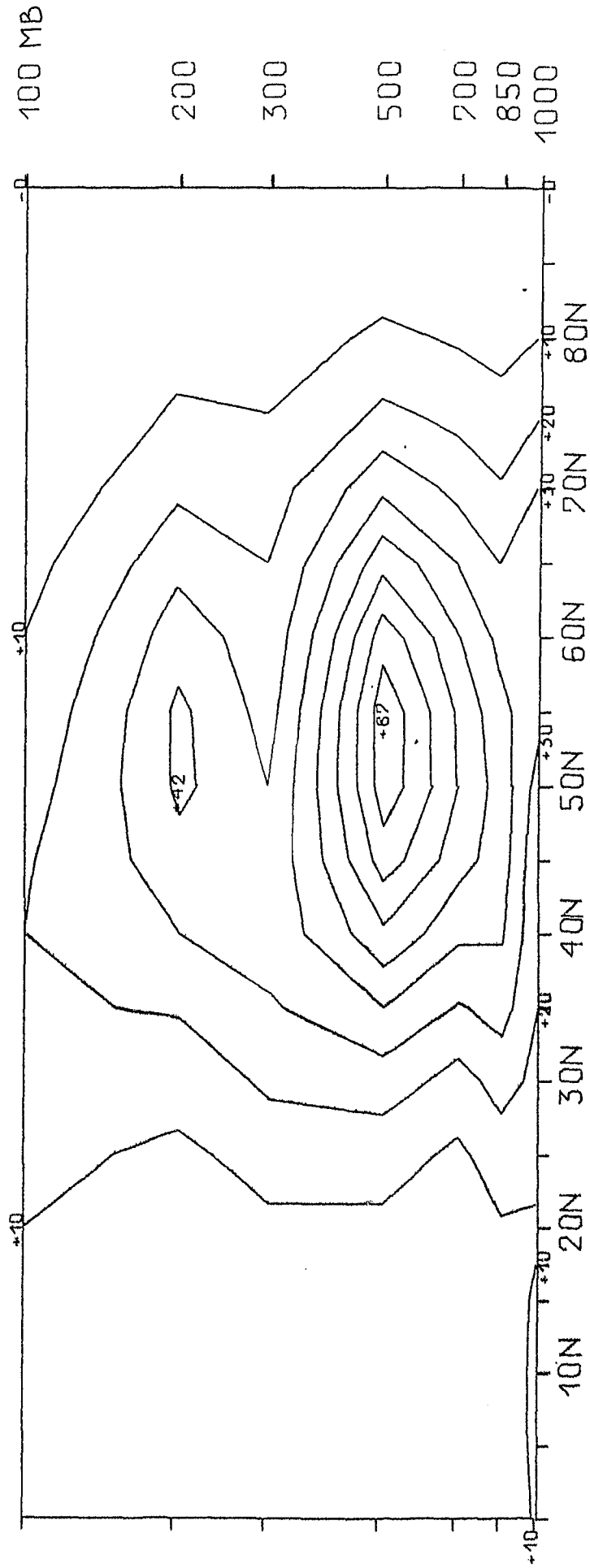
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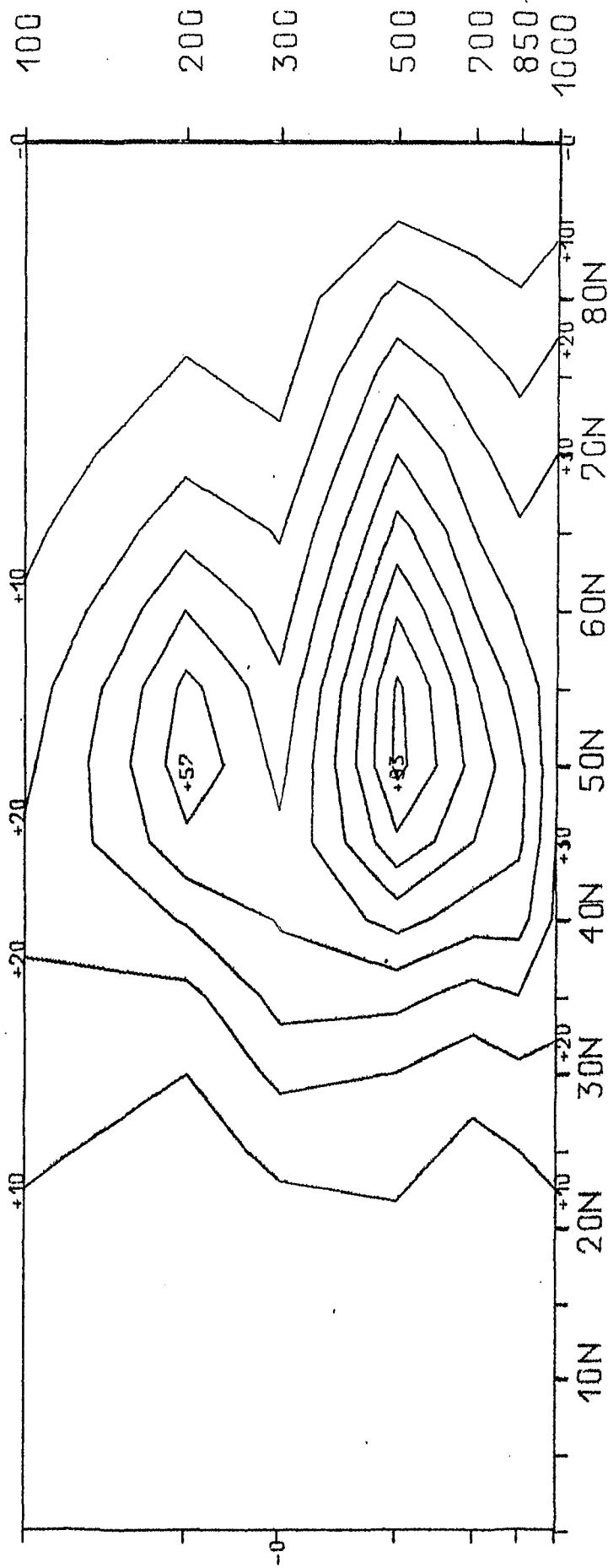
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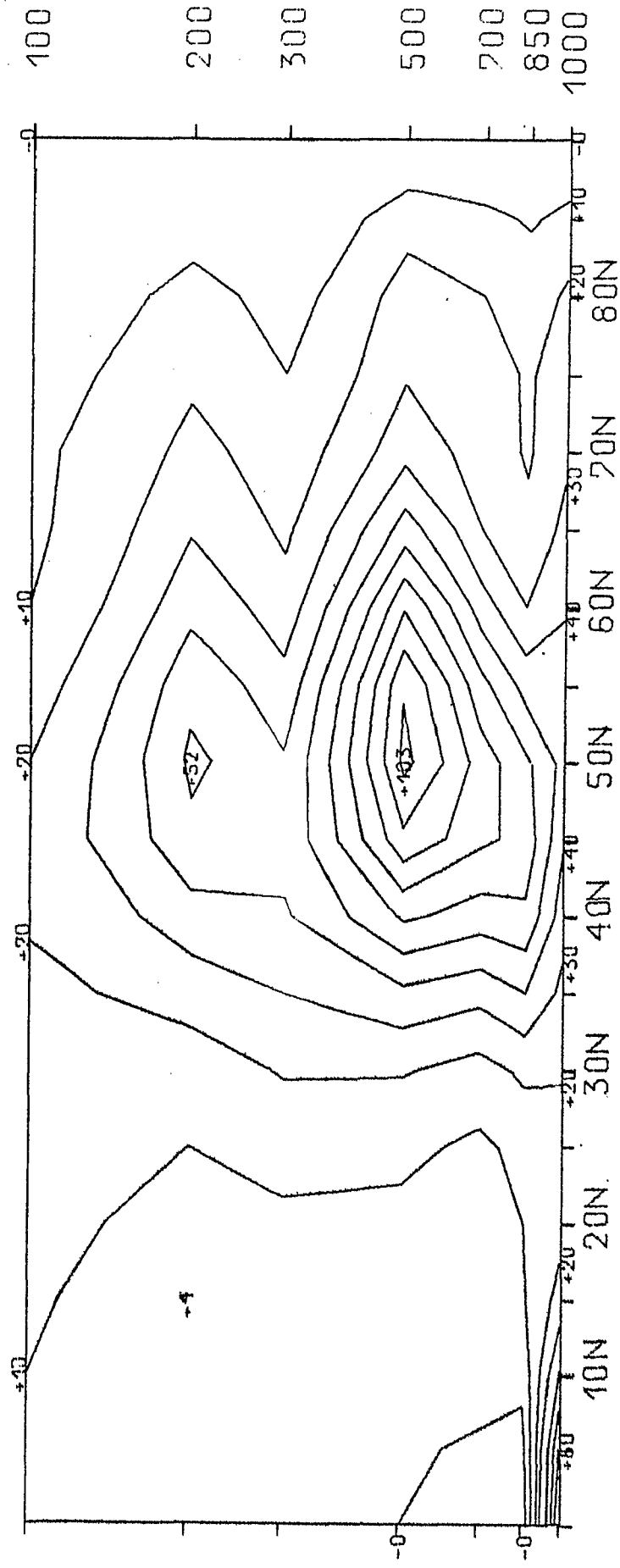
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KENNZIFFER: 37107500

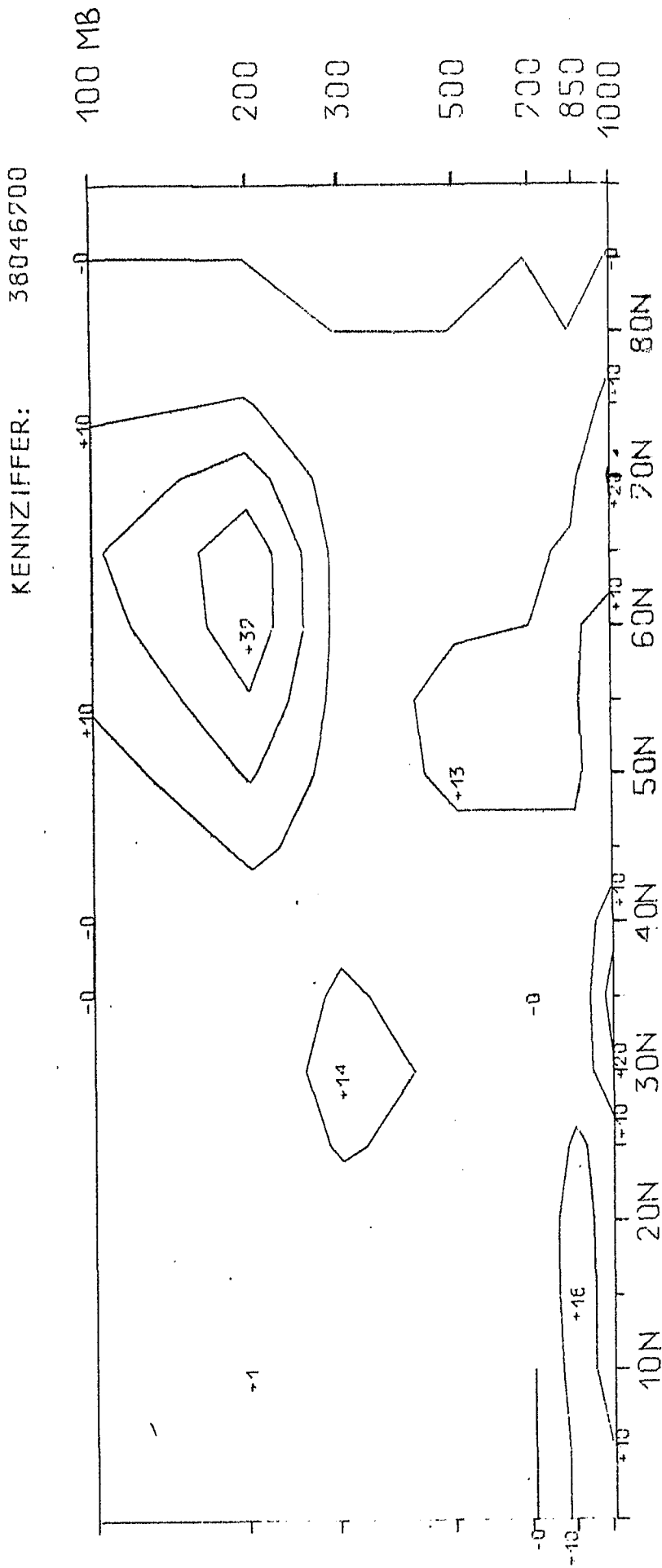


A_{TE} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT. 75

KENNZIFFER: 37107600

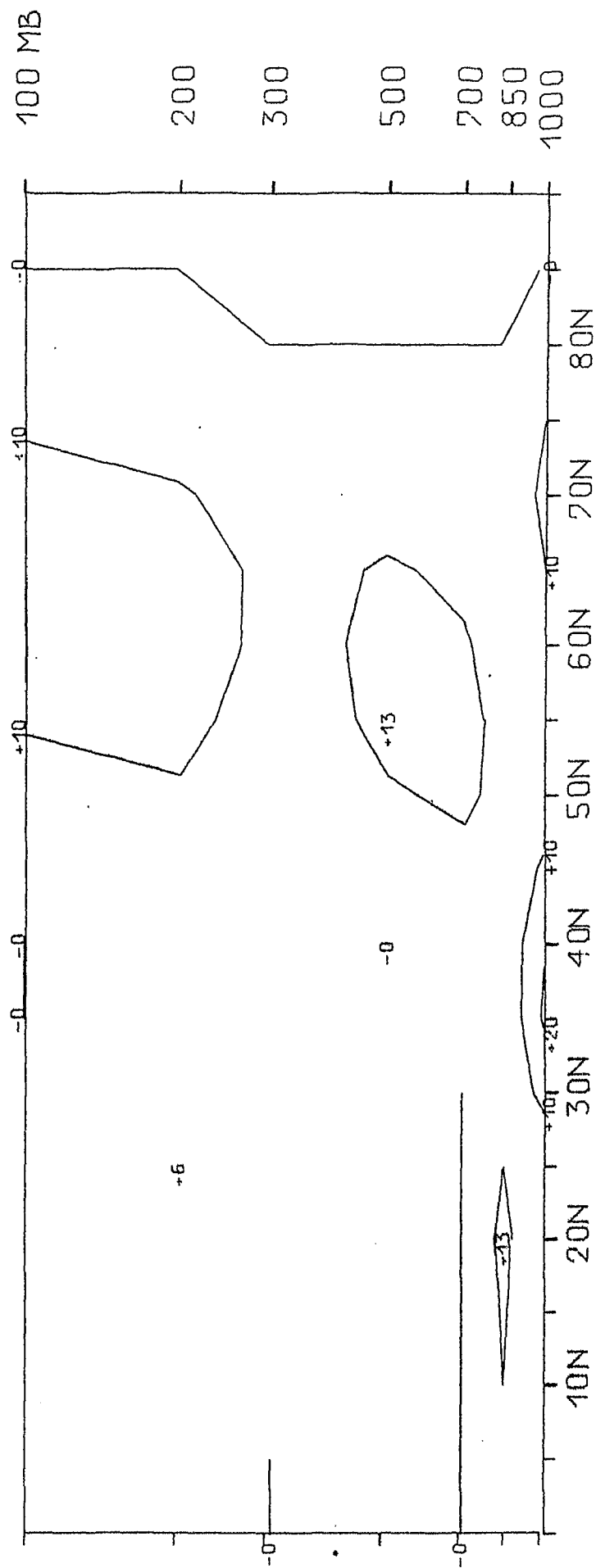


A_{TE}
 $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT. 76



$A_{MSE, 1}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 67

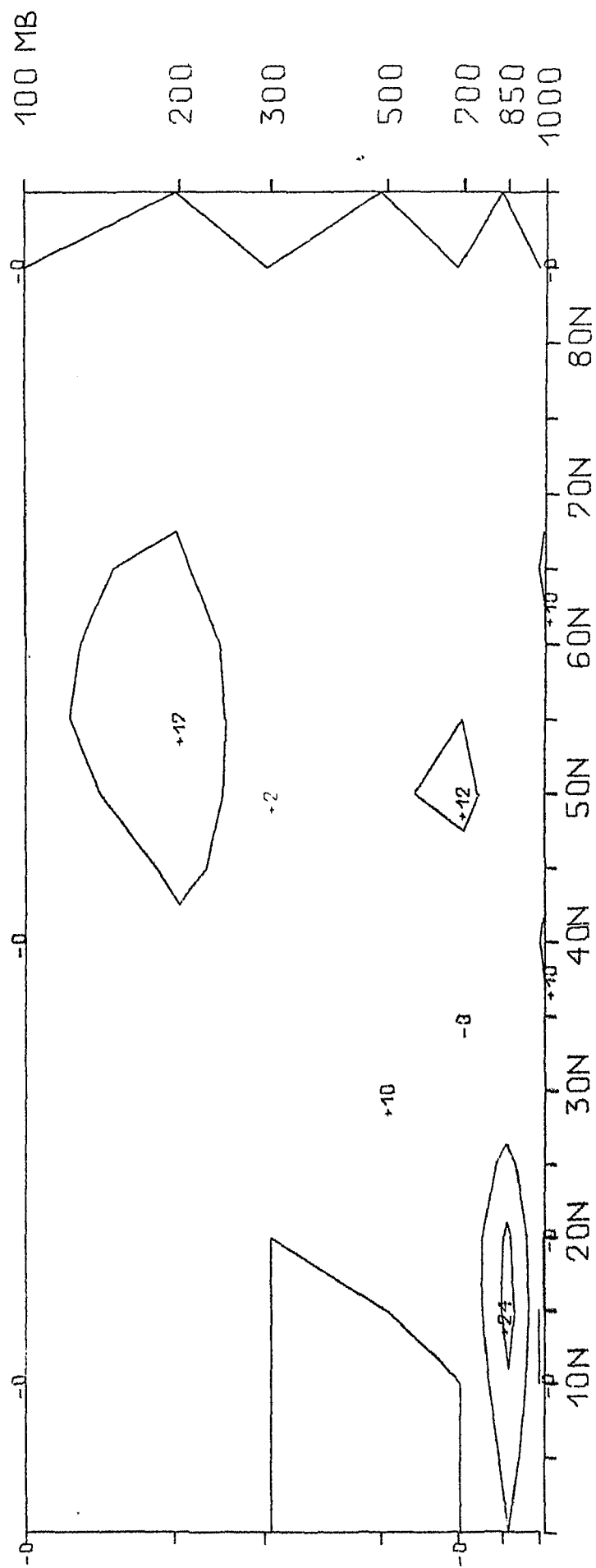
KENNZIFFER: 38046800



$A_{MSE, 1}$

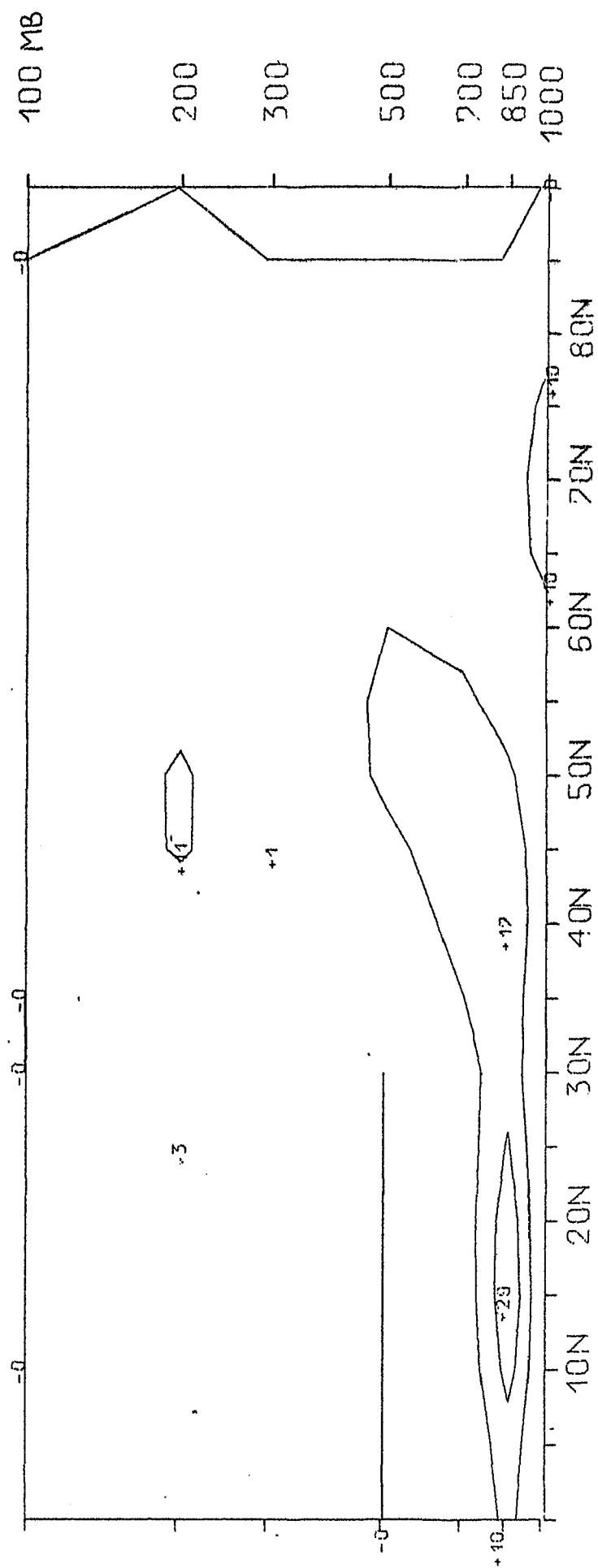
$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 68

KENNZIFFER: 38046900



$A_{MSE, 1}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 69

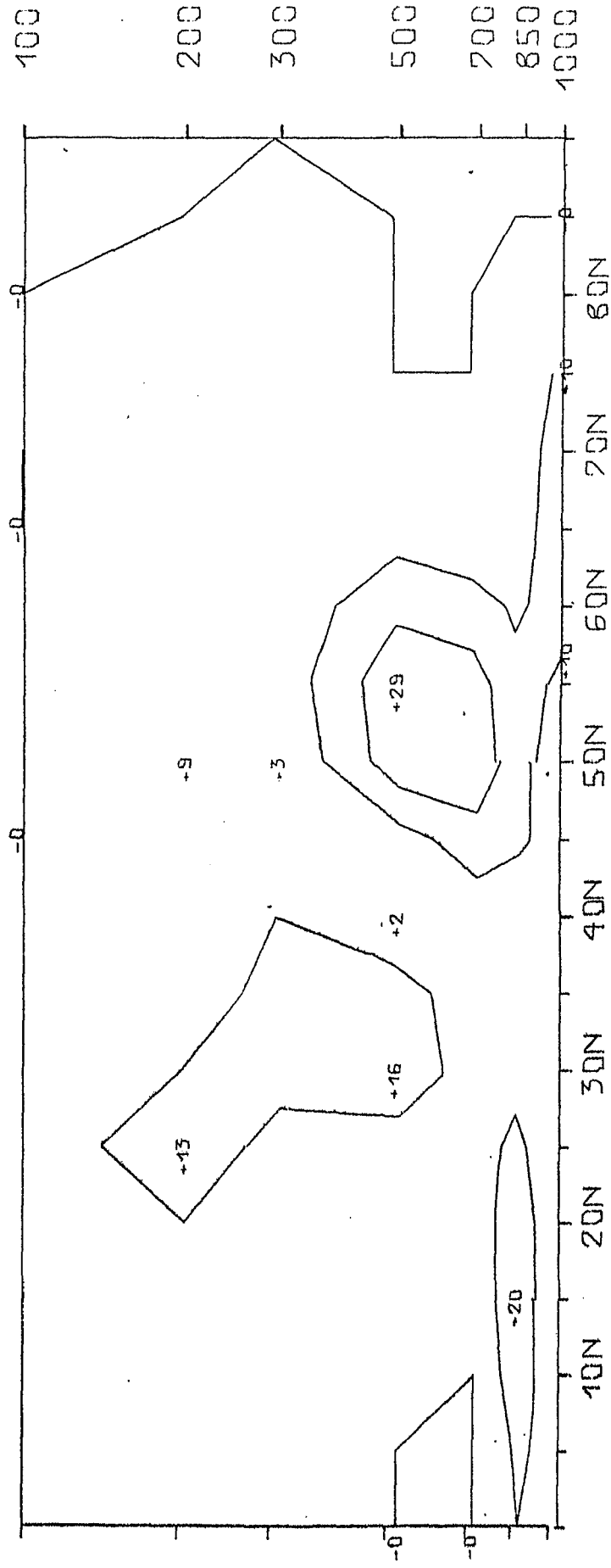
KENNZIFFER: 36047000



$A_{\text{MSE}, 1} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 70

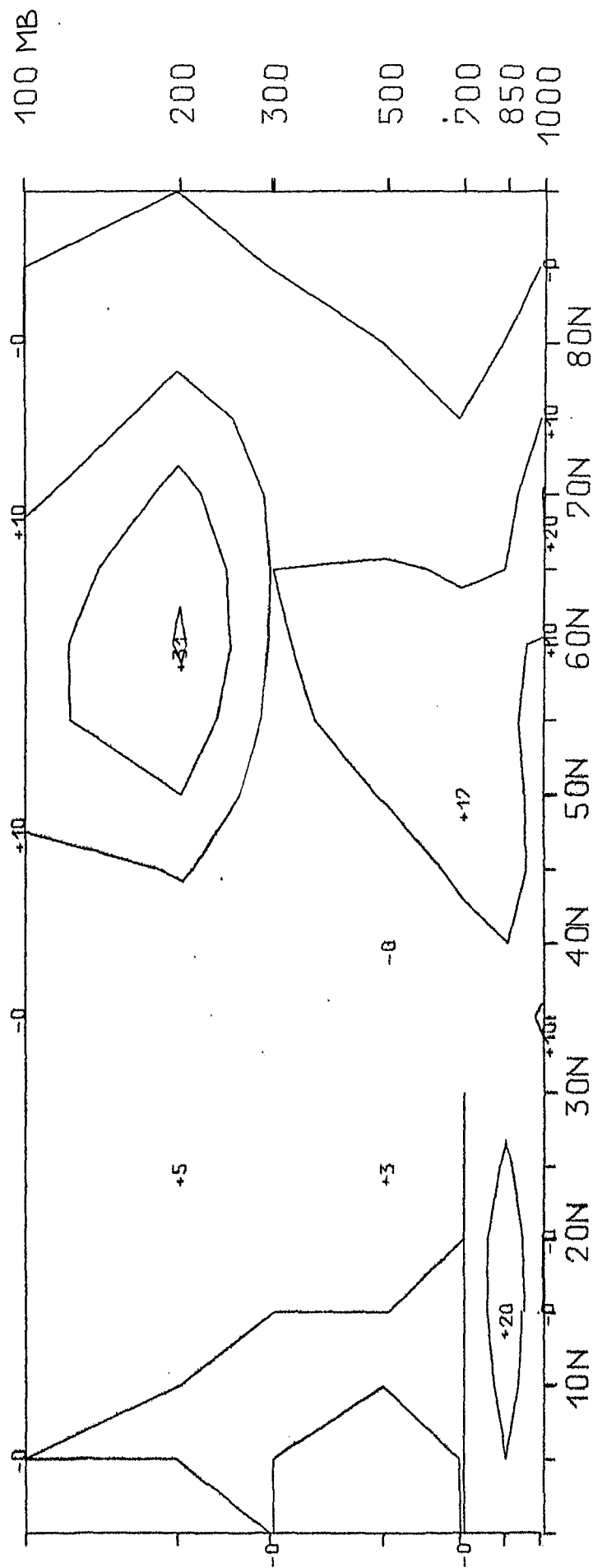
Abb. 52

KENNZIFFER: 38047100



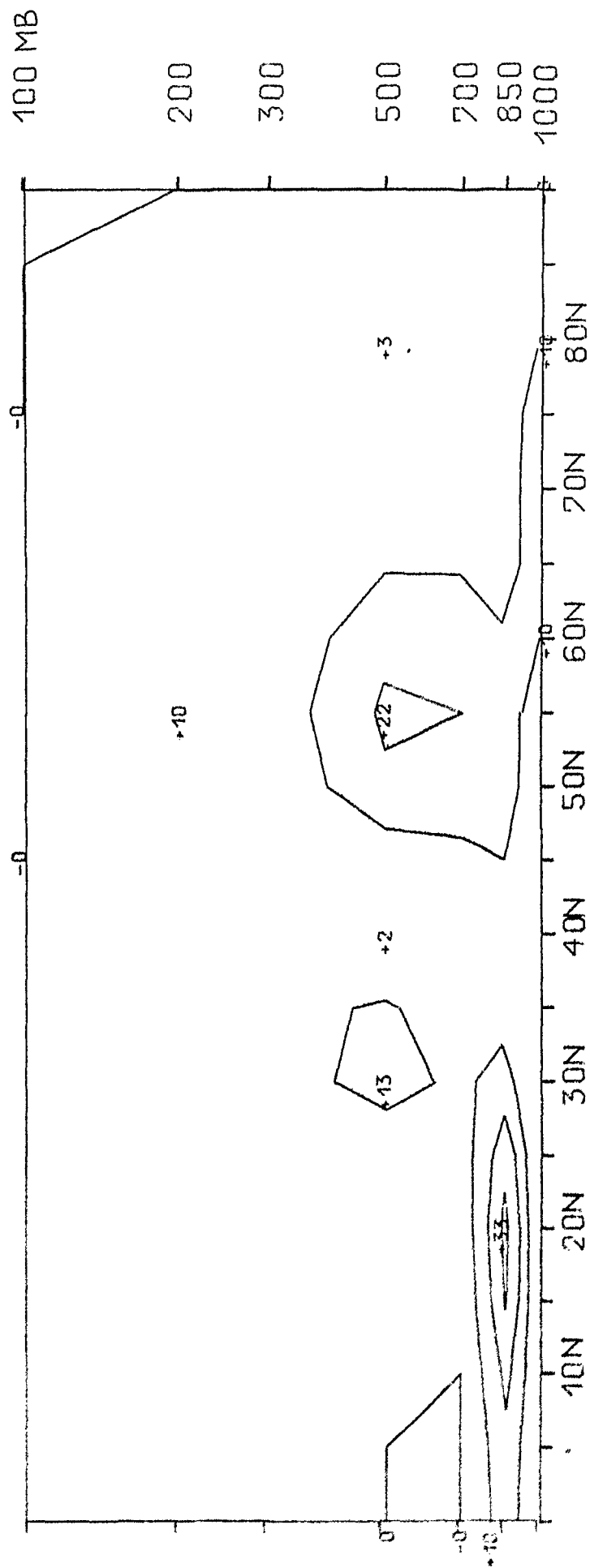
$A_{\text{mse}, 1}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 71

KENNZIFFER: 38047200



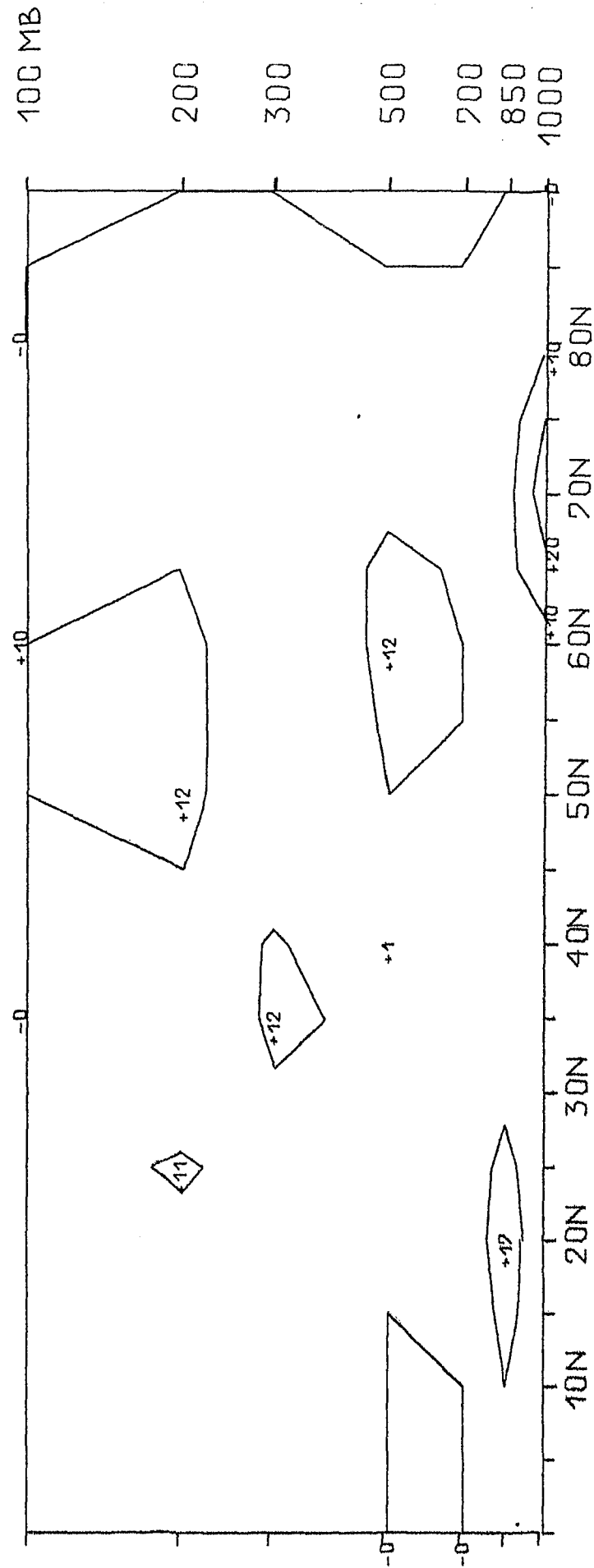
$A_{MSE, 1}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 72

KENNZIFFER: 36047300



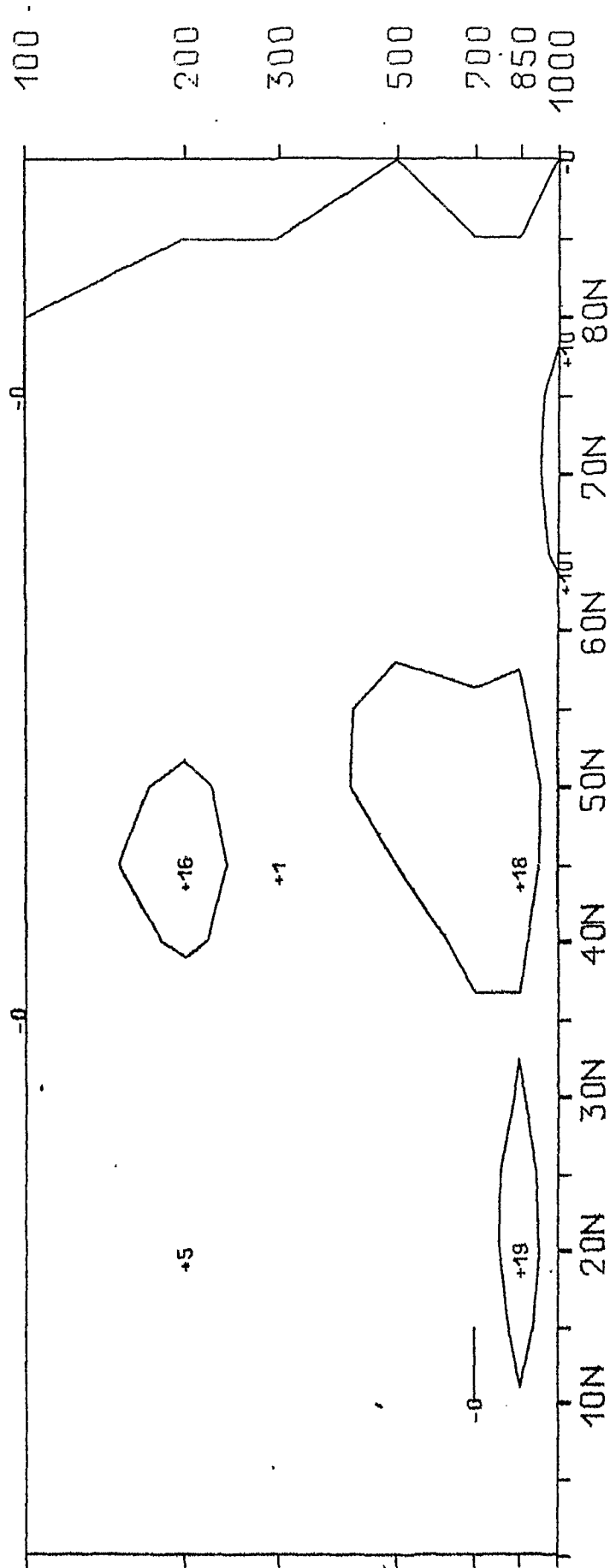
$A_{\text{MSE}} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 73

KENNZIFFER: 38042400



$A_{MSE, 1}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 74

KENNZIFFER: 38047500

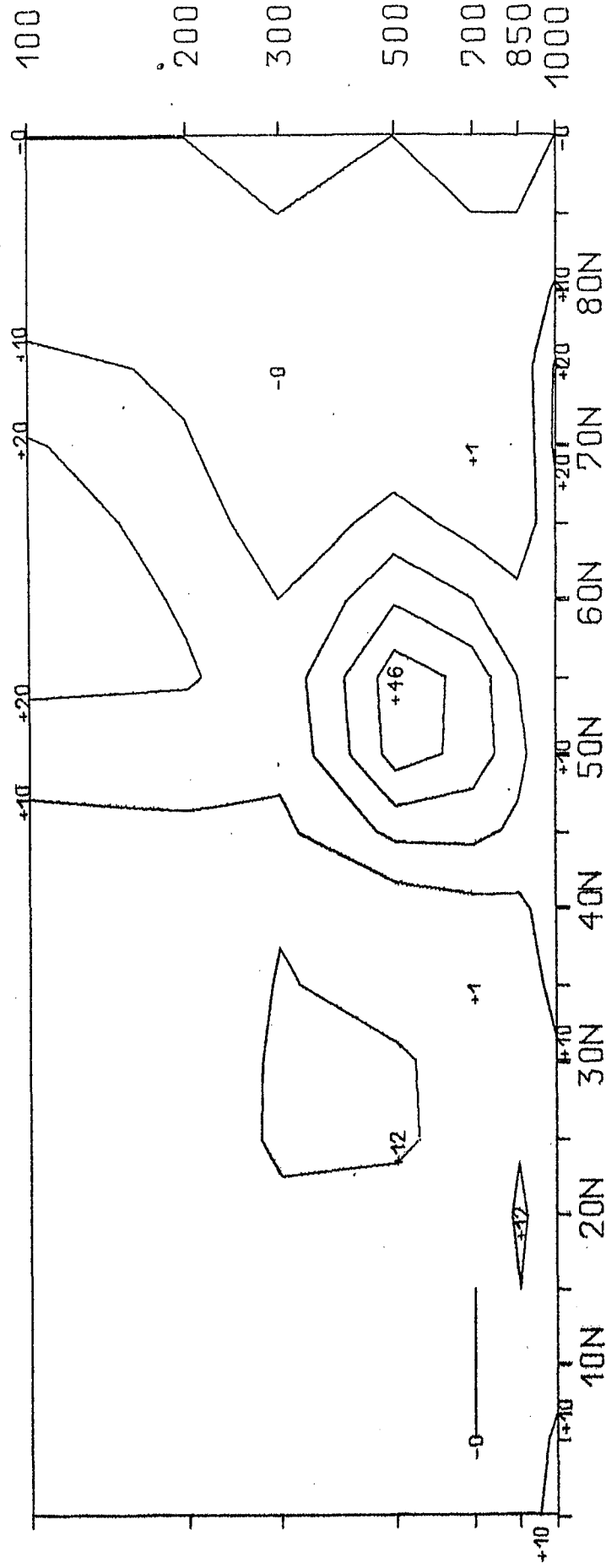


$A_{MSE, 1}$

$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$

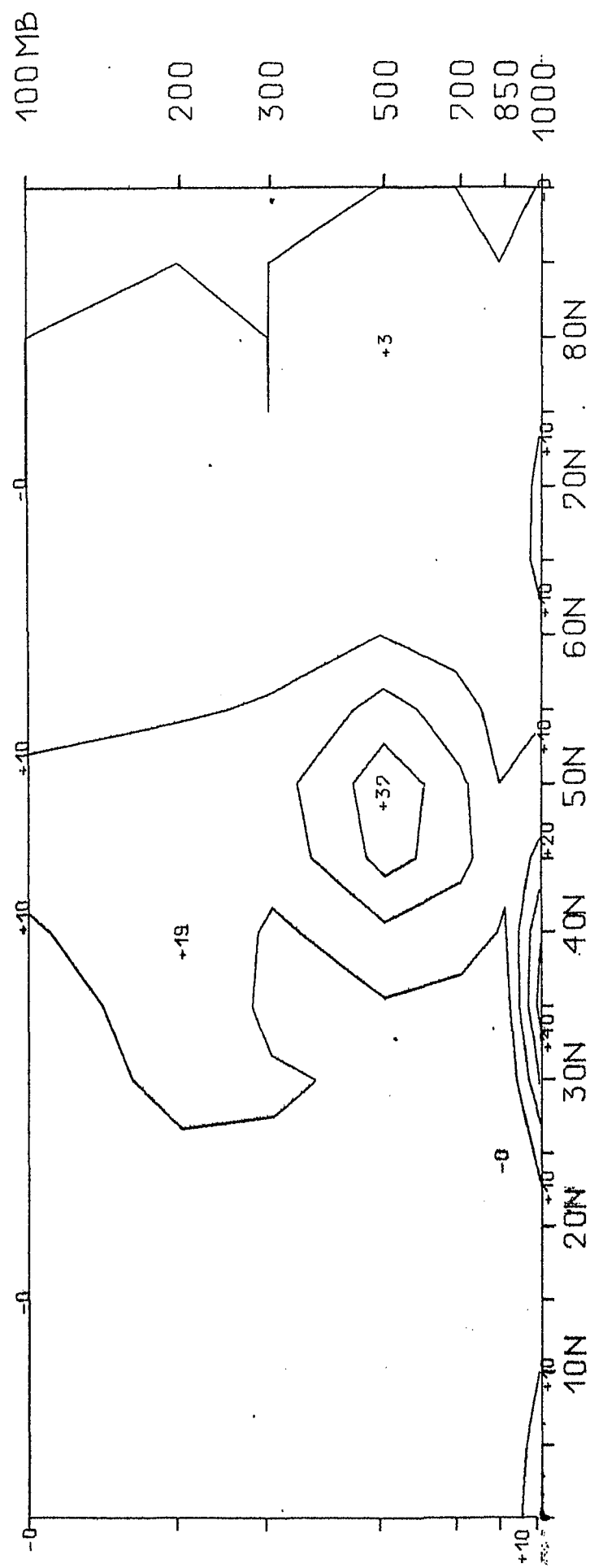
APRIL 75

KENNZIFFER: 38047600



$A_{MSE, 1}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 76

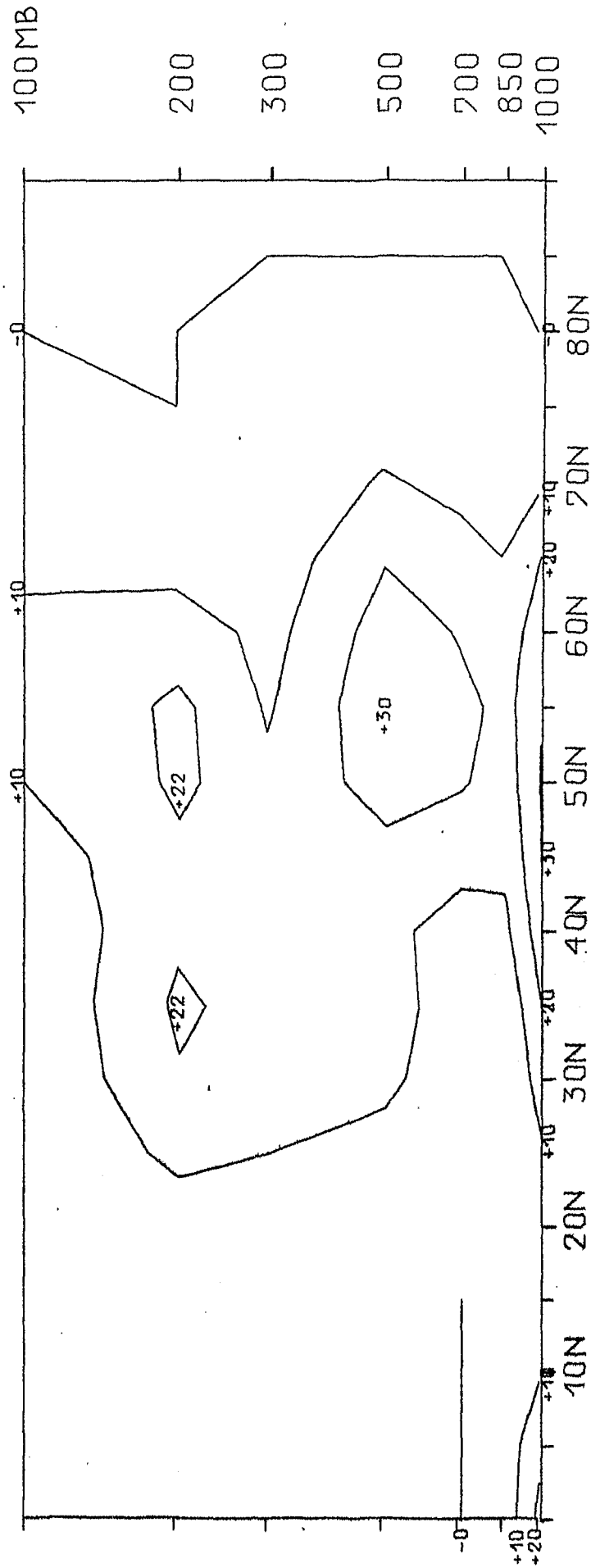
KENNZIFFER: 38106700



$A_{MSE, 1}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT.67

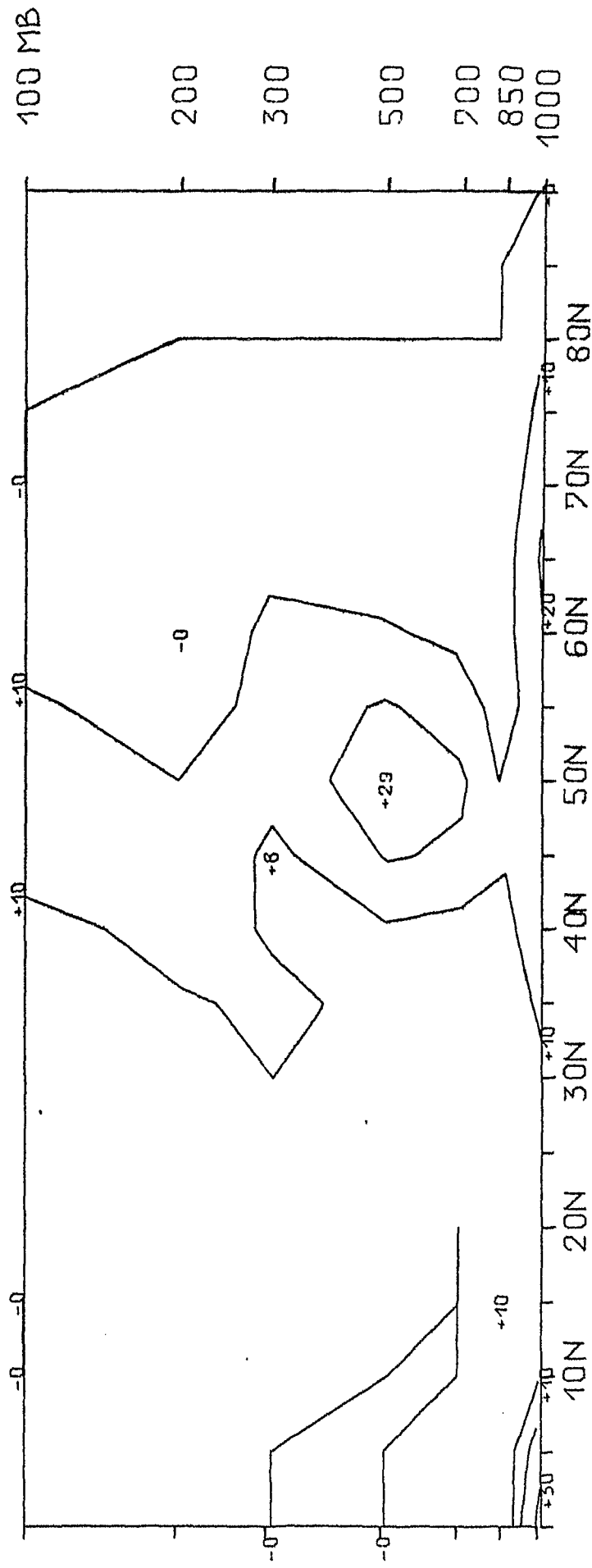
Abb.57

KENNZIFFER: 38106800



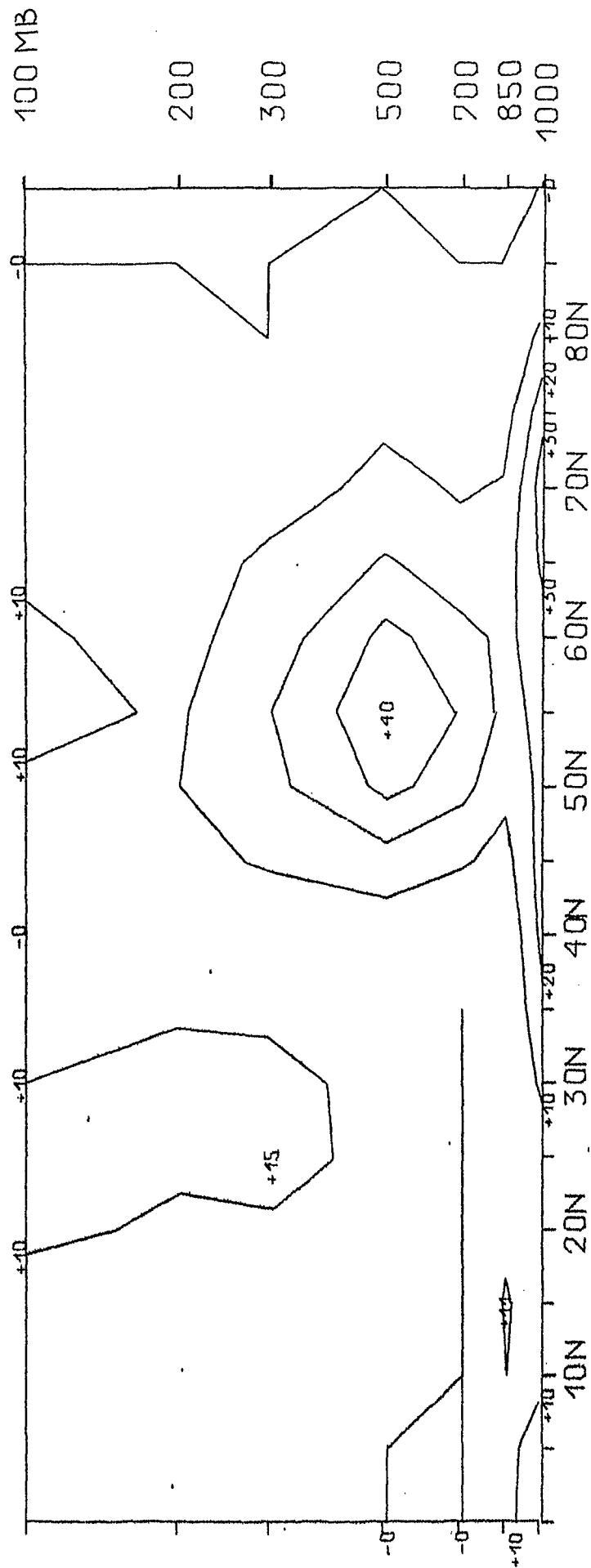
$A_{MSE, 1}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT.68

KENNZIFFER: 38106900



$A_{MSE, 1}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT.69

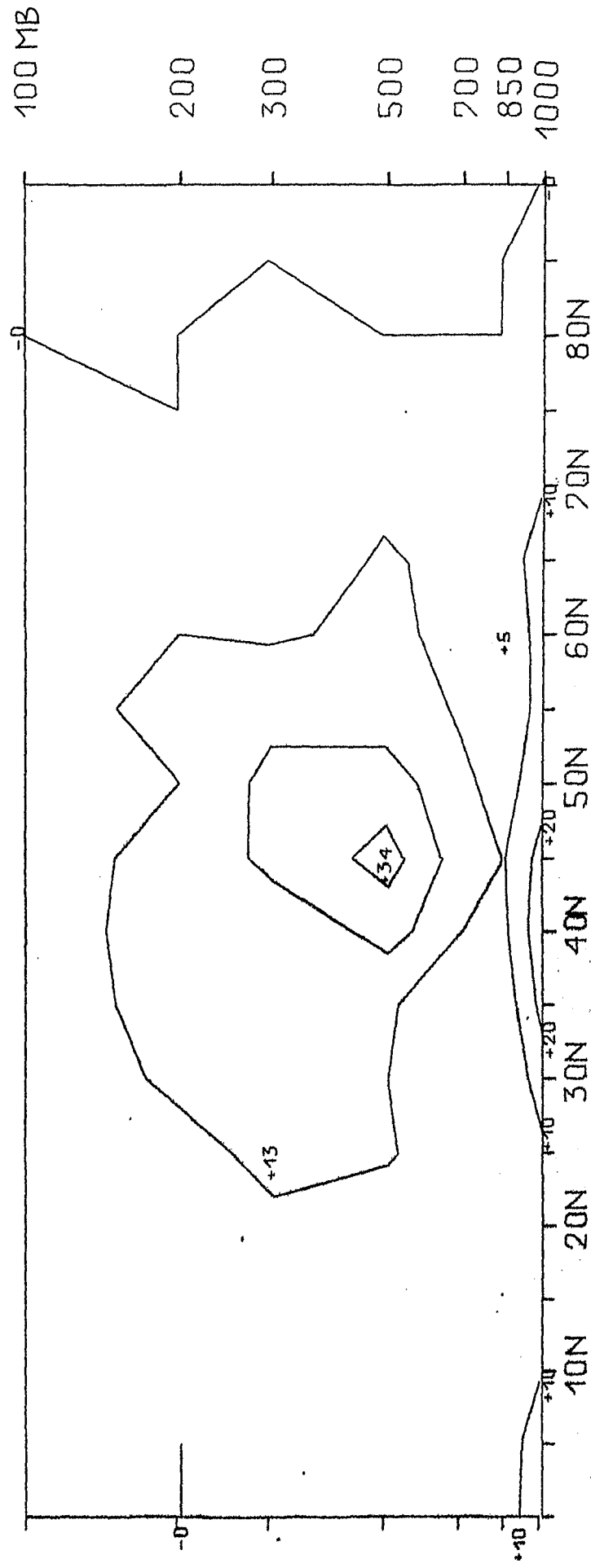
KENNZIFFER: 38107000



$A_{MSE, 1}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT.70

Abb.60

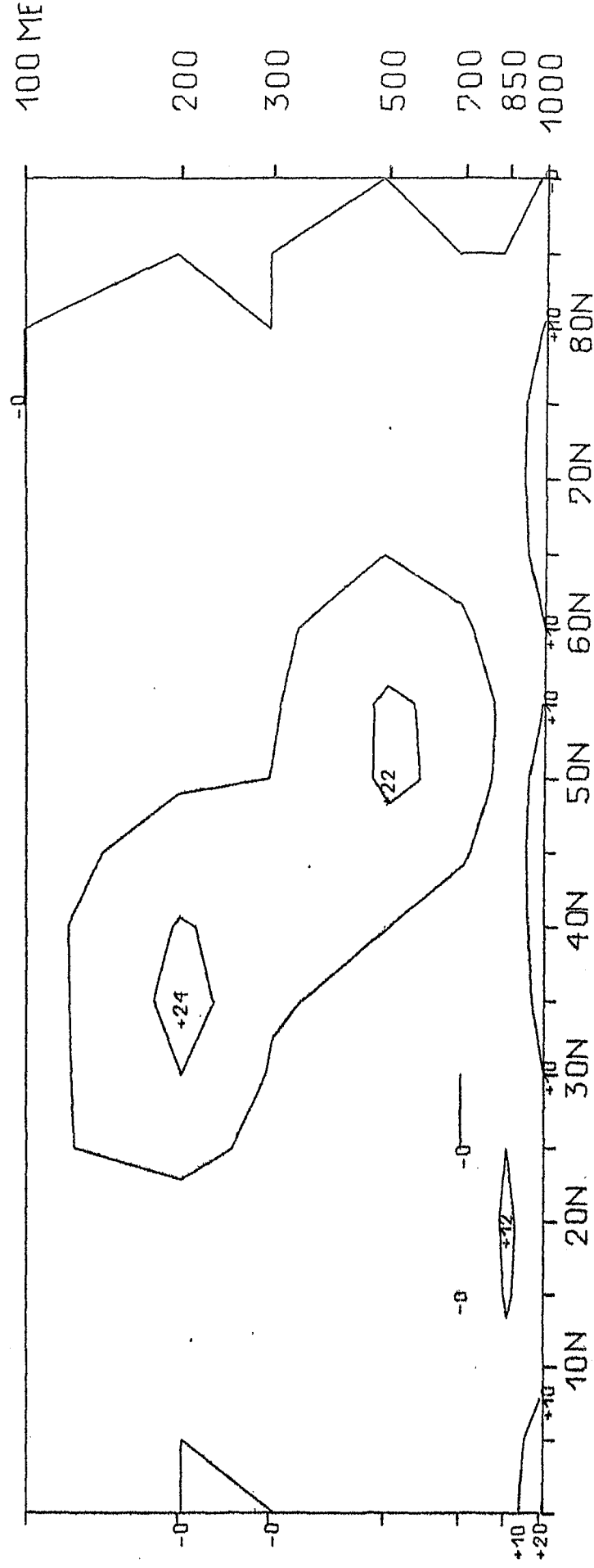
KENNZIFFER: 38107100



$A_{MSE, 1}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.71}$

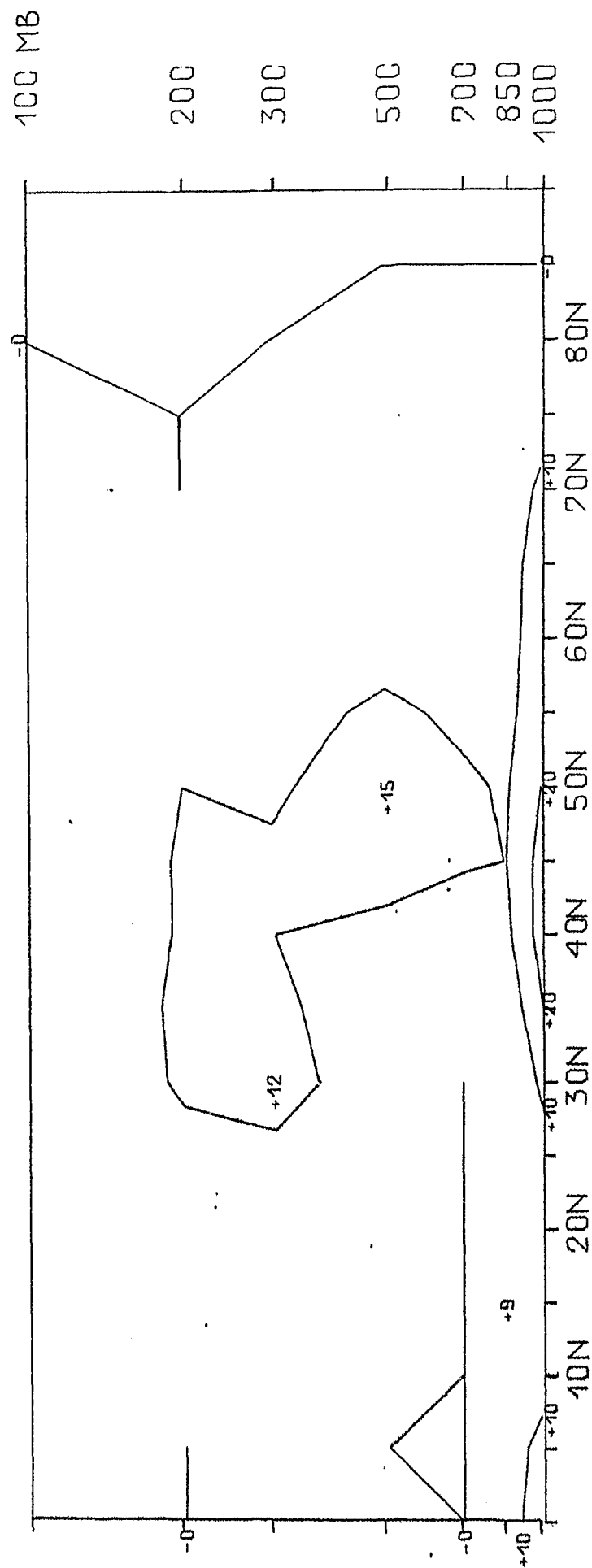
Abb.61

KENNZIFFER: 38107200



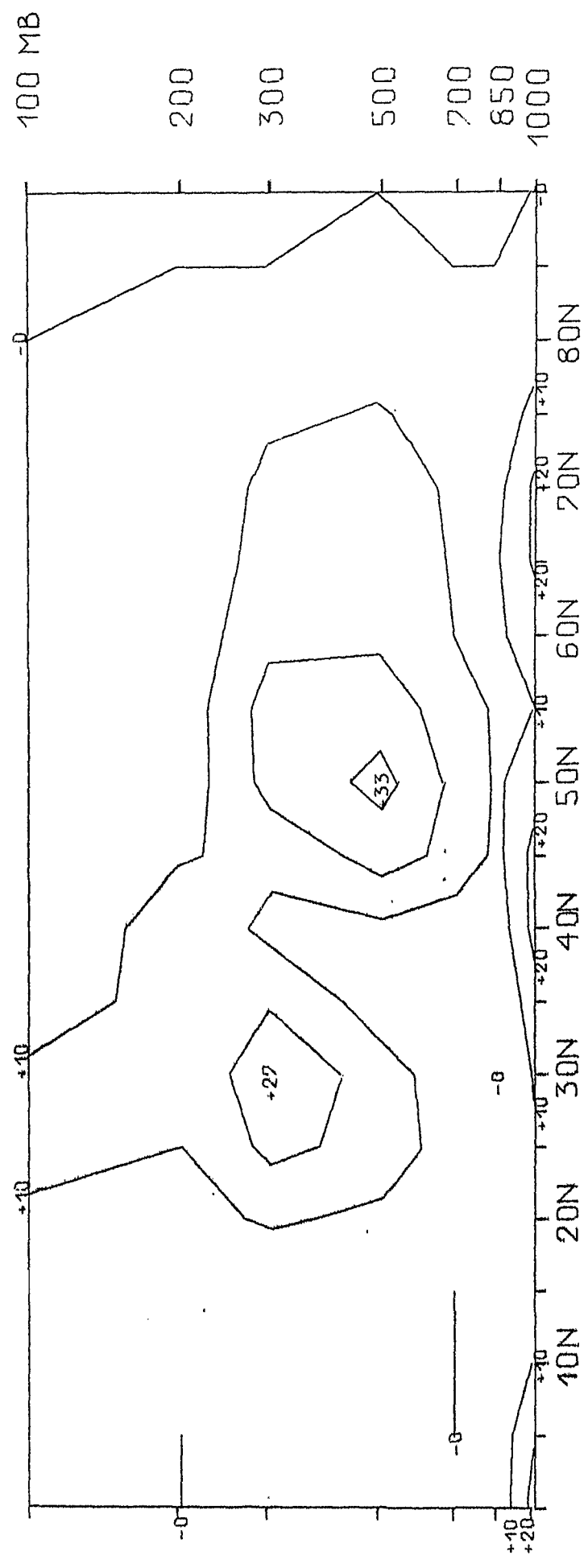
A_{MSE, 1} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.72}$

KENNZIFFER: 36107300



A_{MSE, 1}

KENNZIFFER: 38107400

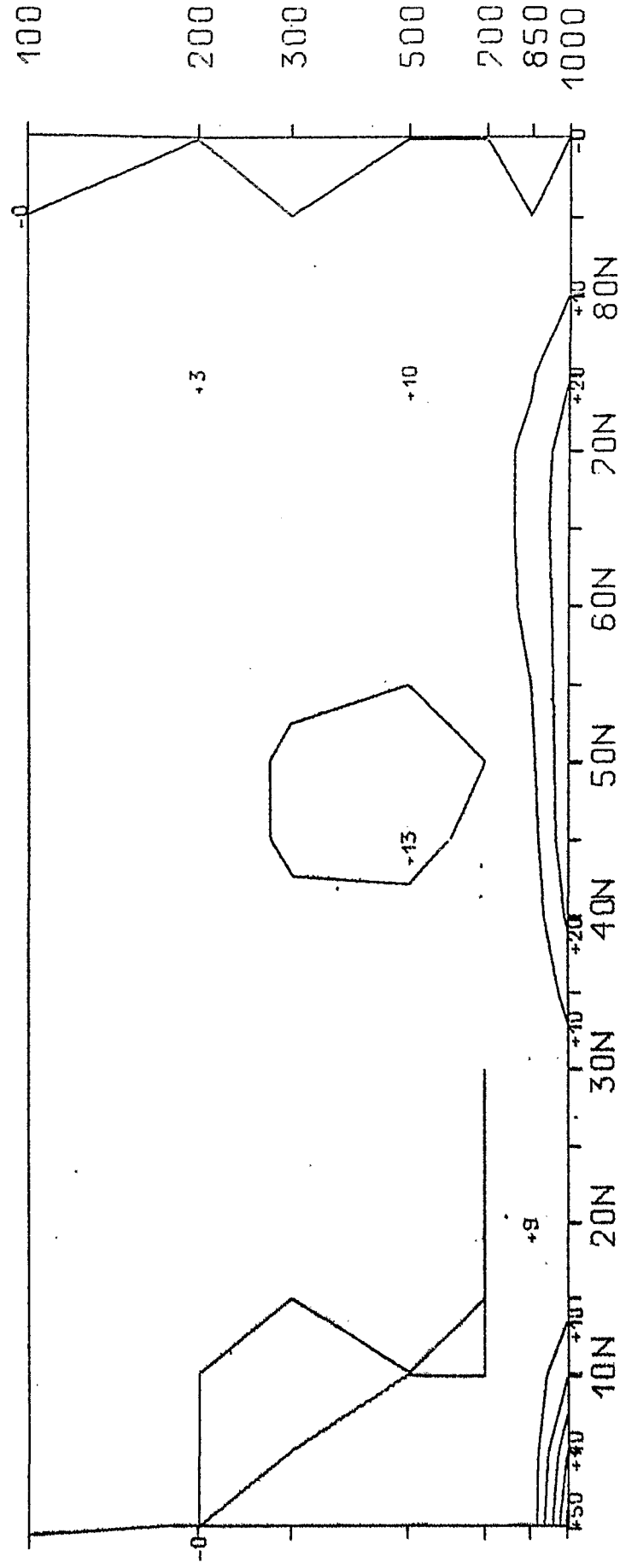


$A_{MSE, 1}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT. 74}$

$A_{\text{MSE: 1}} \quad 10^{-3} \quad \text{J CM}^{-2} \quad \text{MB}^{-1} \quad \text{OKT. 75}$

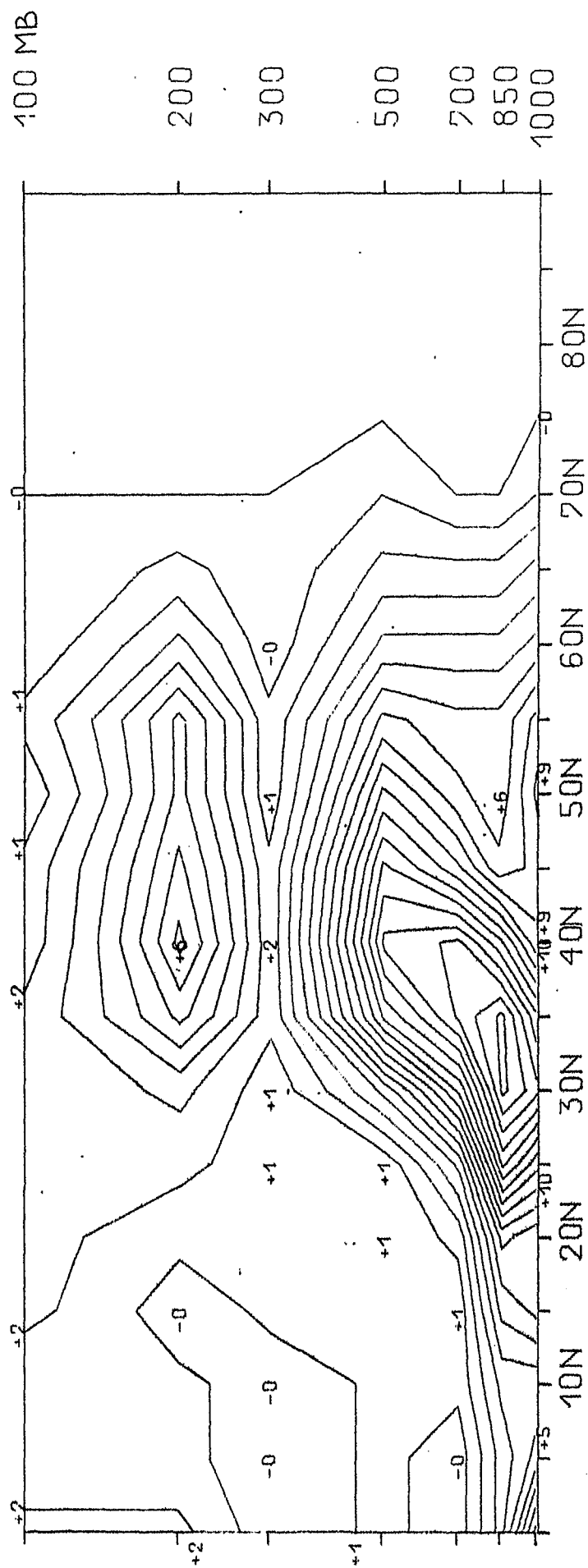
Abb. 64 a

KENNZIFFER: 36107600



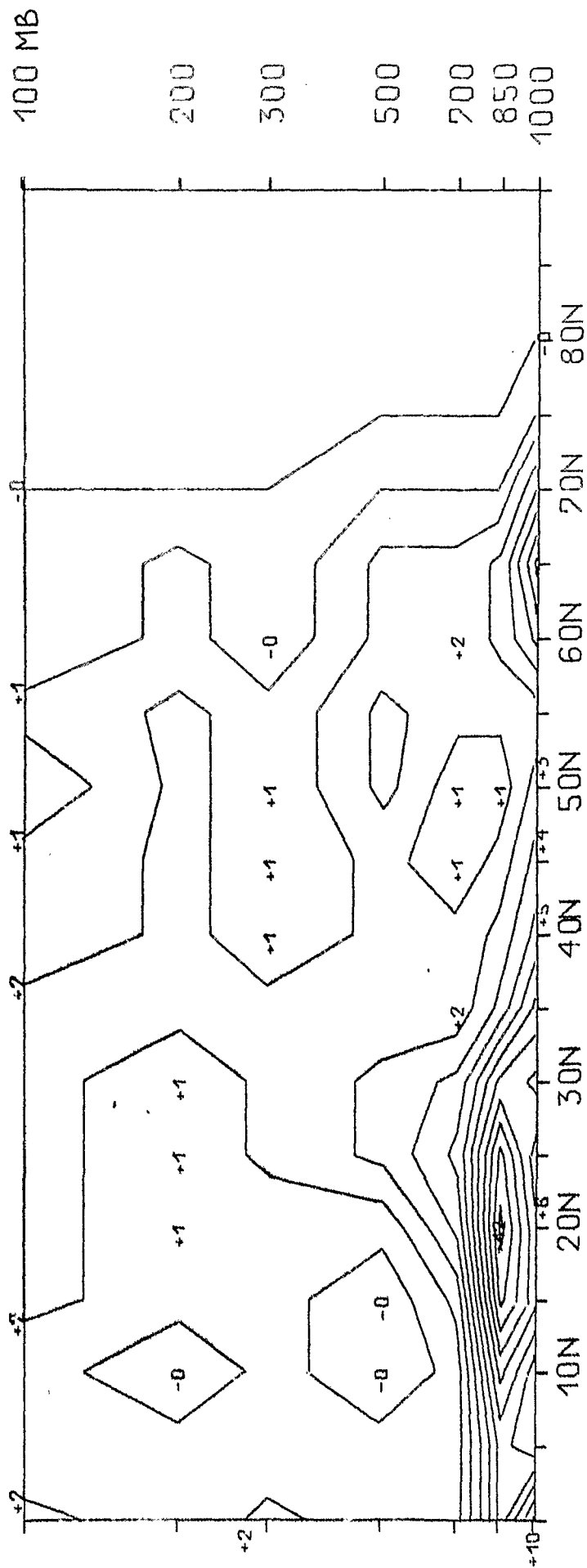
$A_{MSE. 1}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT. 76

KENNZIFFER: 39046700



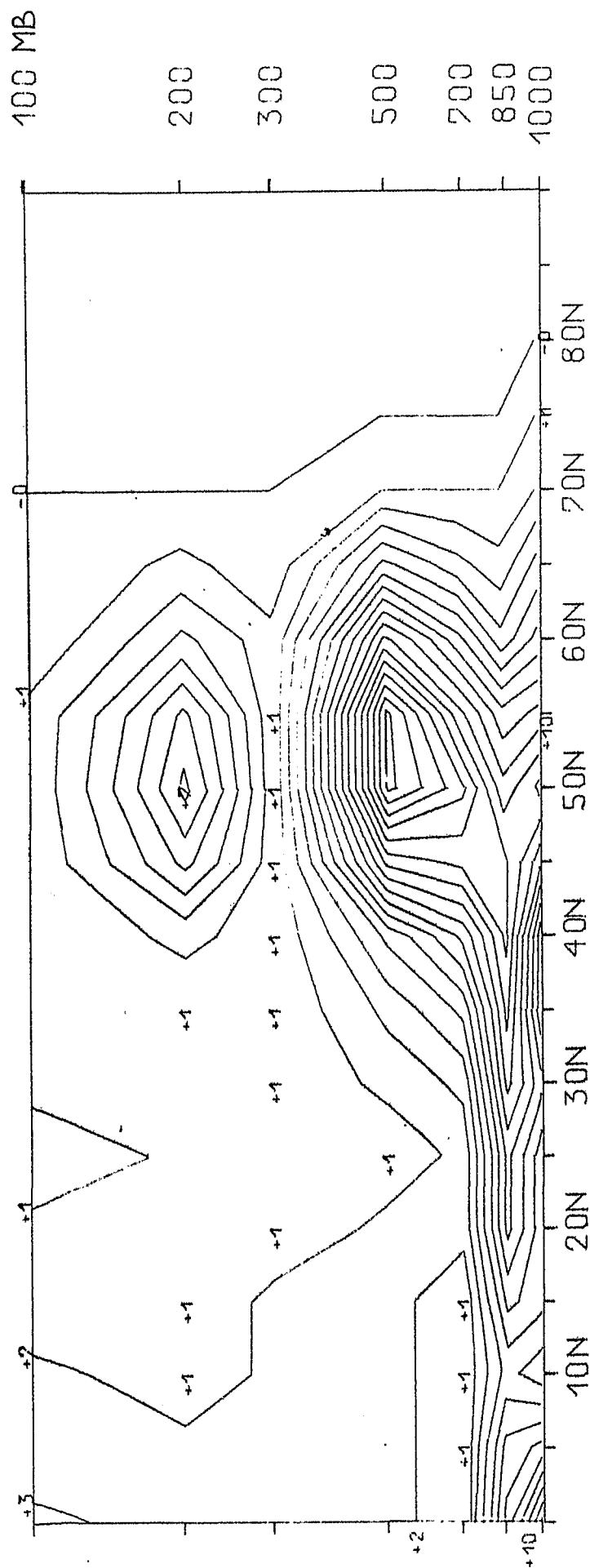
$A_{MSE, 4 - 8} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 67

KENNZIFFER: 39046800



$A_{MSE, 4-8} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 68

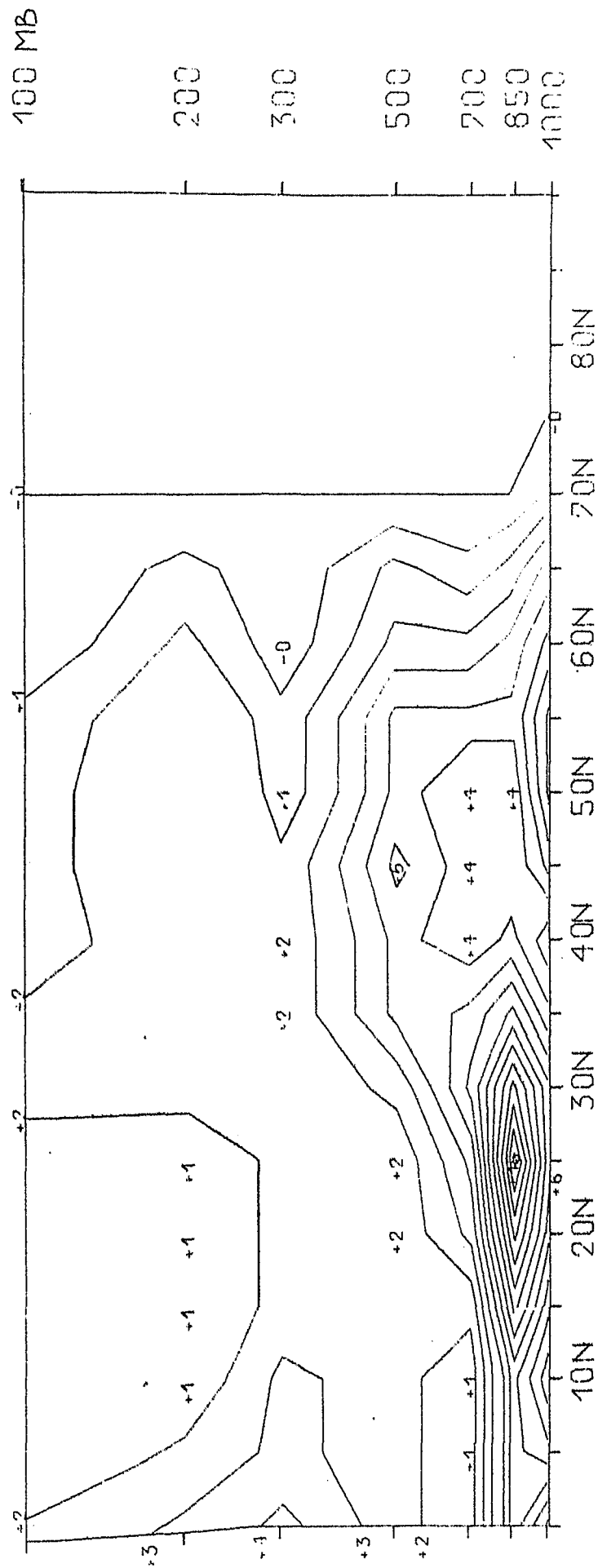
KENNZIFFER: 39046900



$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 69

$A_{\text{MSE}, 4 - 8}$

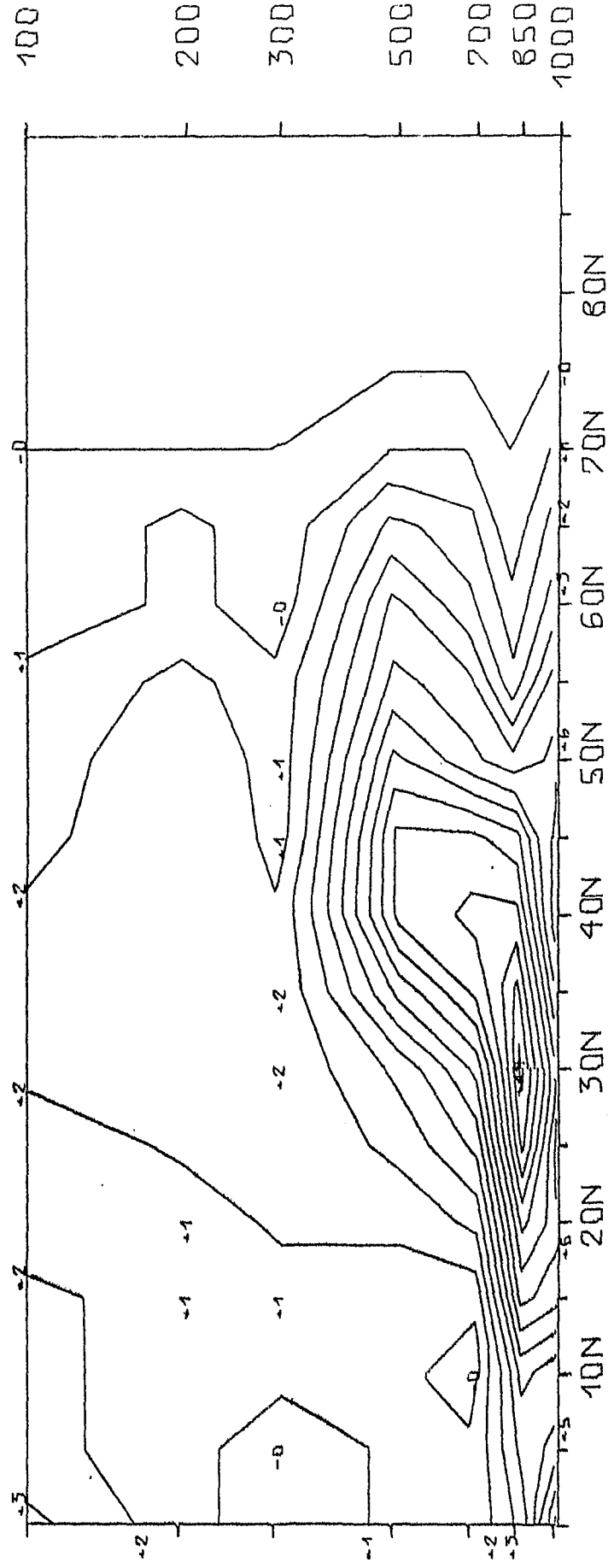
KENNZIFFER. 39047000



A $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 70

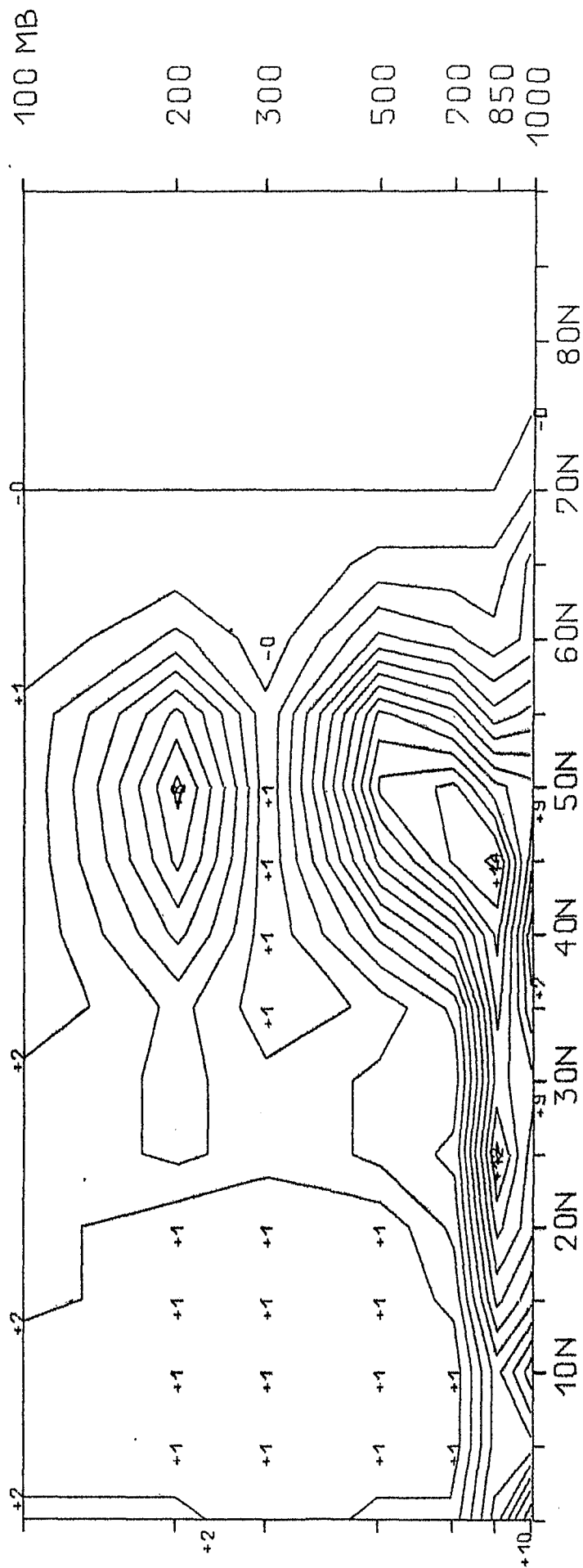
MSE. 1 - 8

KENNZIFFER: 39047100



$A_{MSE, 4-8}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL

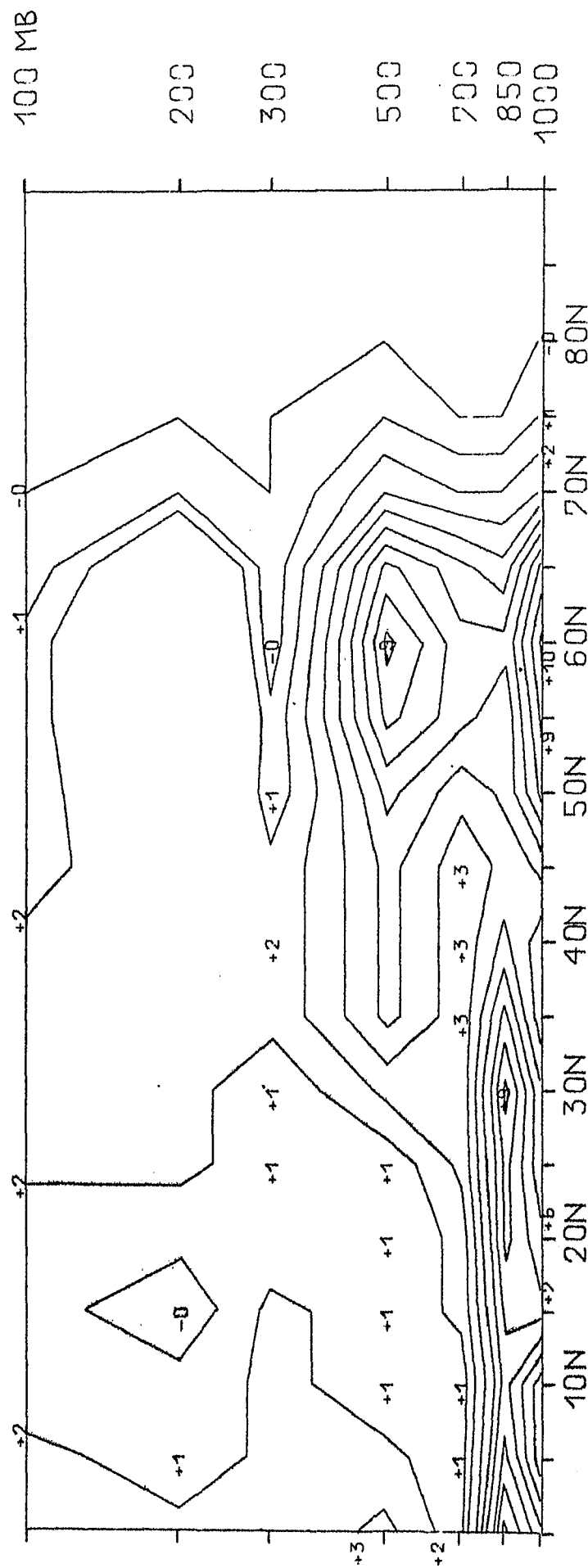
KENNZIFFER: 39047200



$\bar{A}_{MSE, 4-8} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 72

Abb. 70

KENNZIFFER: 39047300

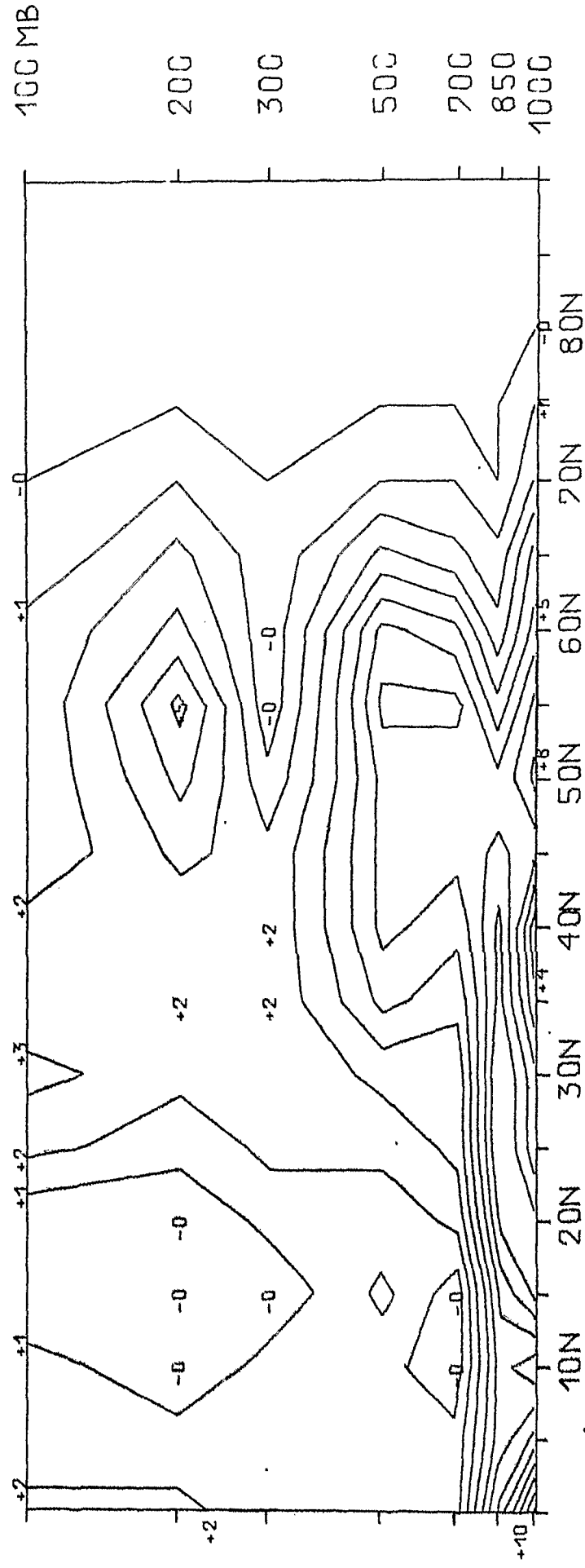


$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 73

$A_{\text{MSE}, 4 - 8}$

Abb. 71

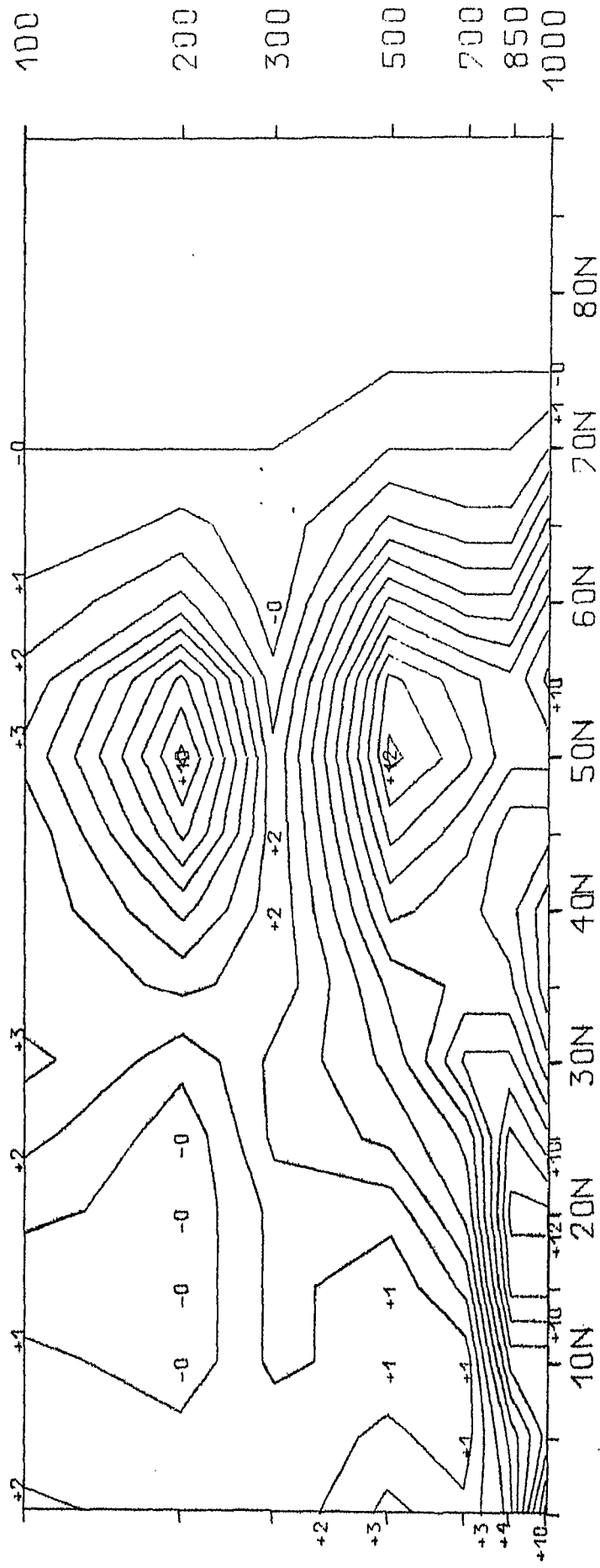
KENNZIFFER: 39047400



$A_{MSE, 4-8} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 74

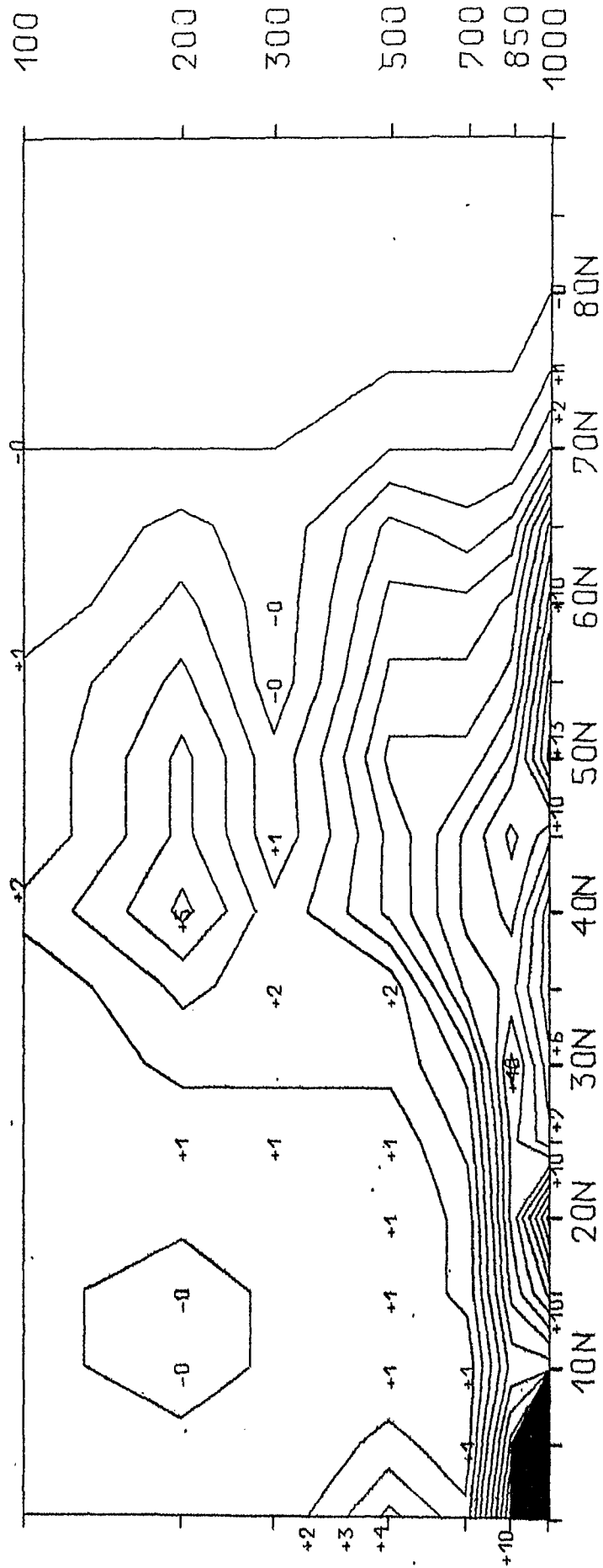
Abb. 72

KENNZIFFER: 39047500



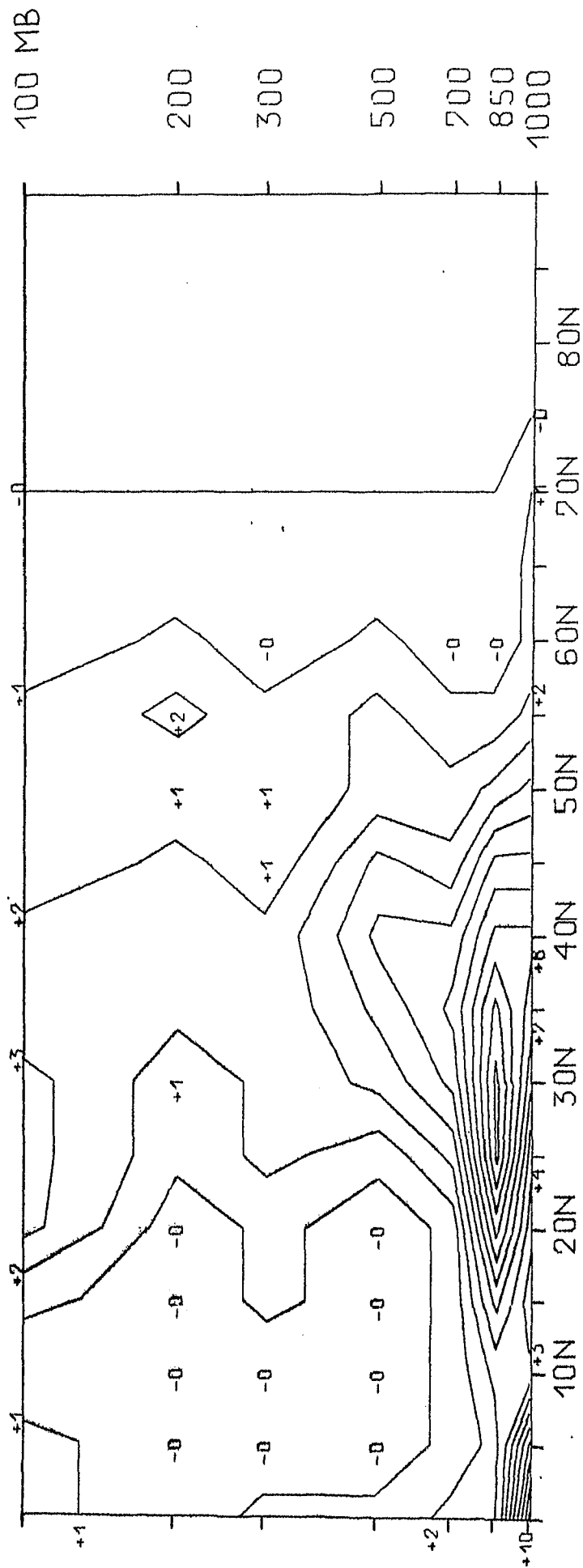
$A_{MSE, 4 - 8} \quad 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \quad \text{APRIL 75}$

KENNZIFFER: 39047600



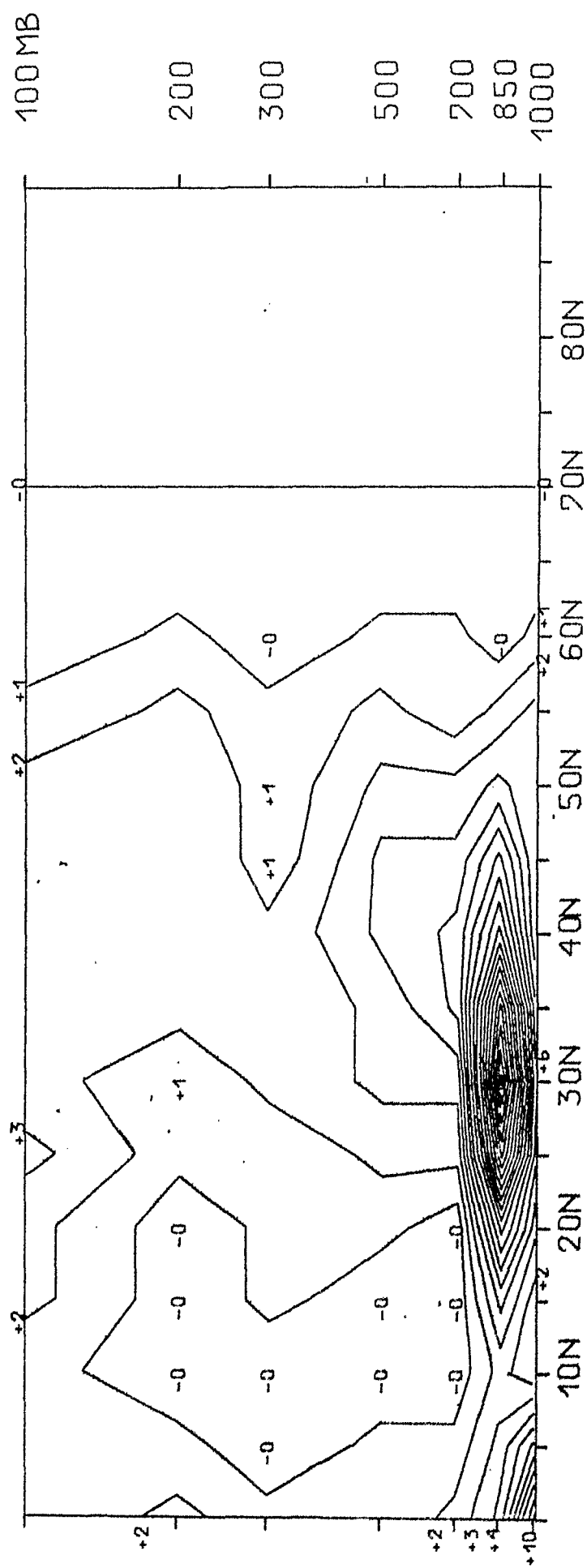
$A_{MSE, 4 - 8} \cdot 10^{-3} \text{ JCM}^{-2} \text{ MB}^{-1}$ APRIL 76

KENNZIFFER: 39106700



$A_{MSE, 4 = 6} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.67}$

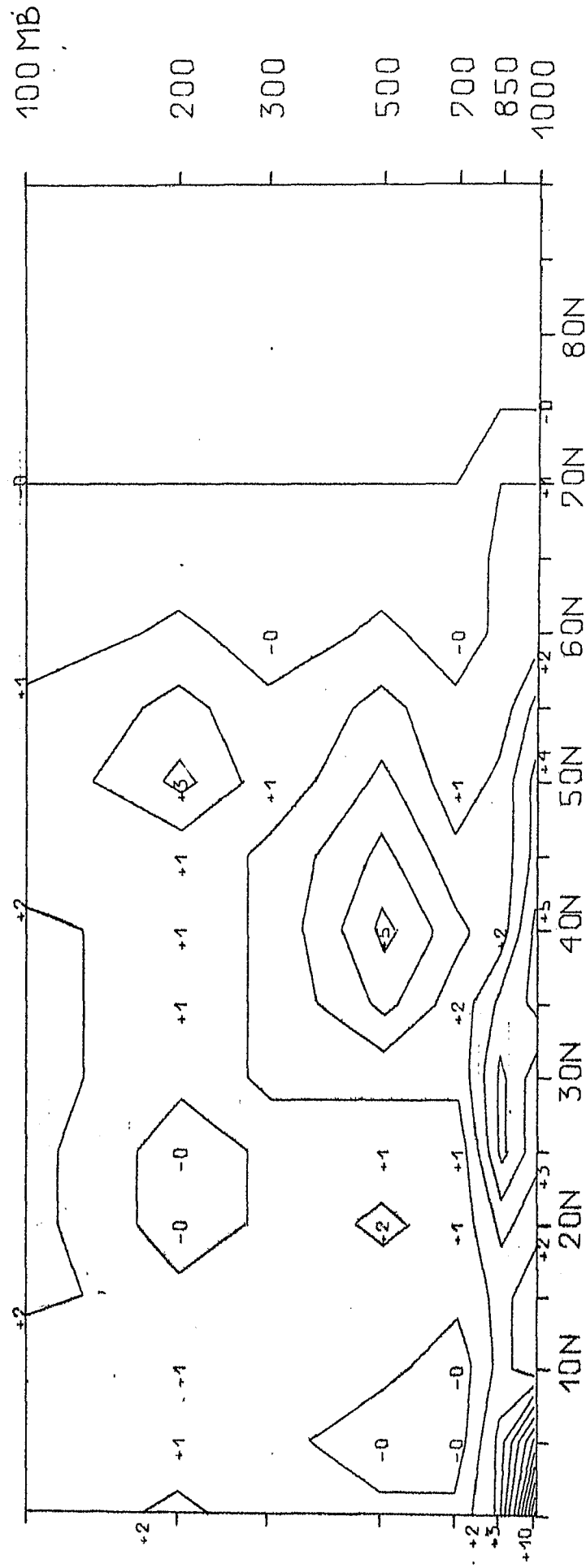
KENNZIFFER: 39106800



$A_{MSE, 4-6} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT. 68

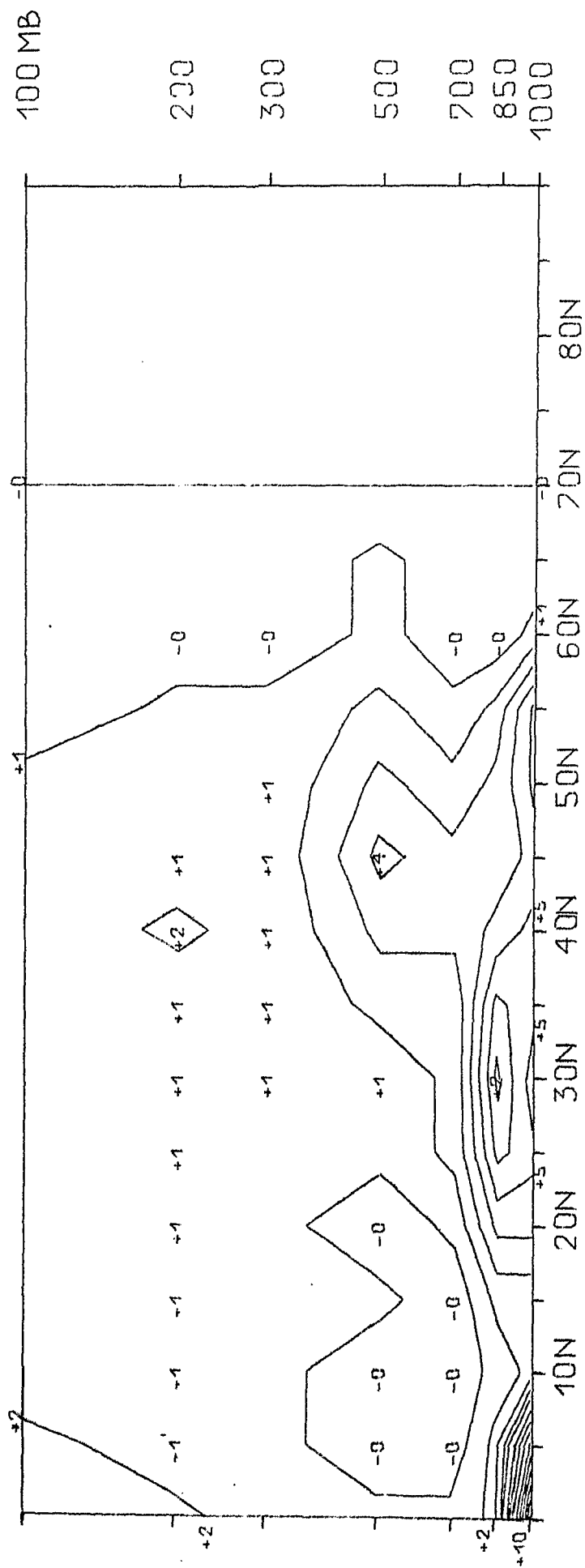
Abb. 74

KENNZIFFER: 39106900



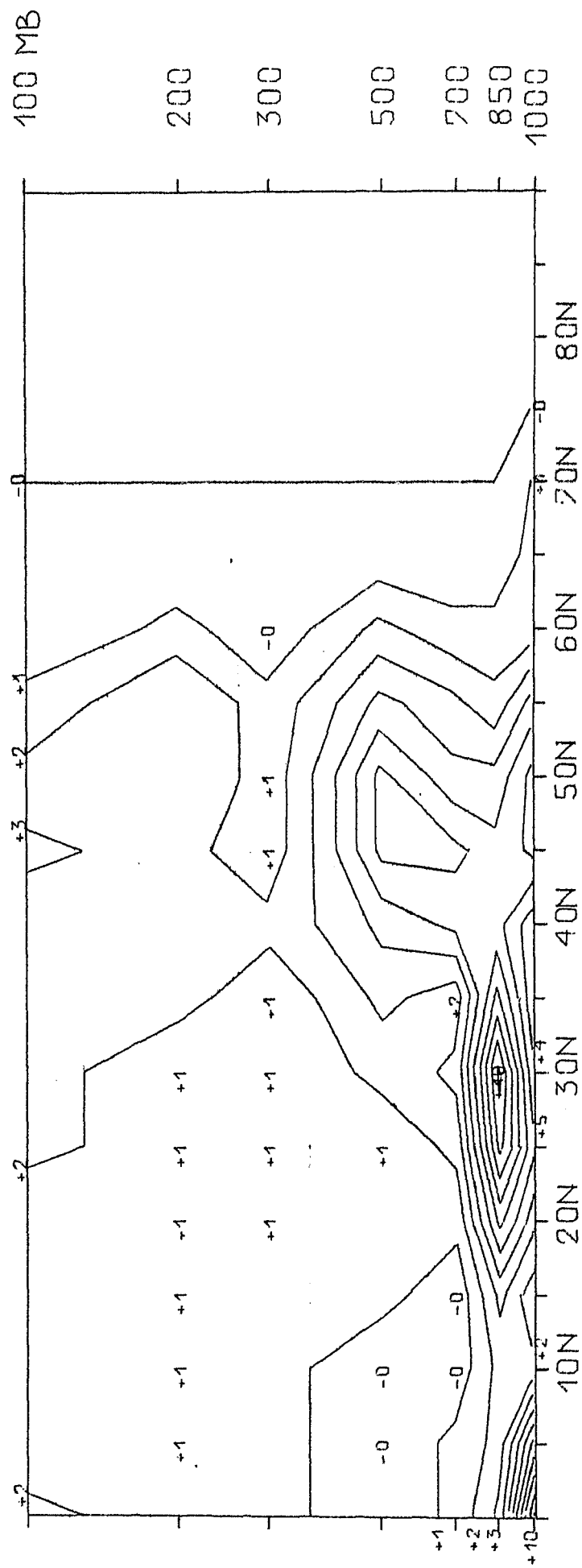
$\bar{A}_{MSE, 4-8} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT.69

KENNZIFFER: 39107000



$A_{MSE, 4-6} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.70}$

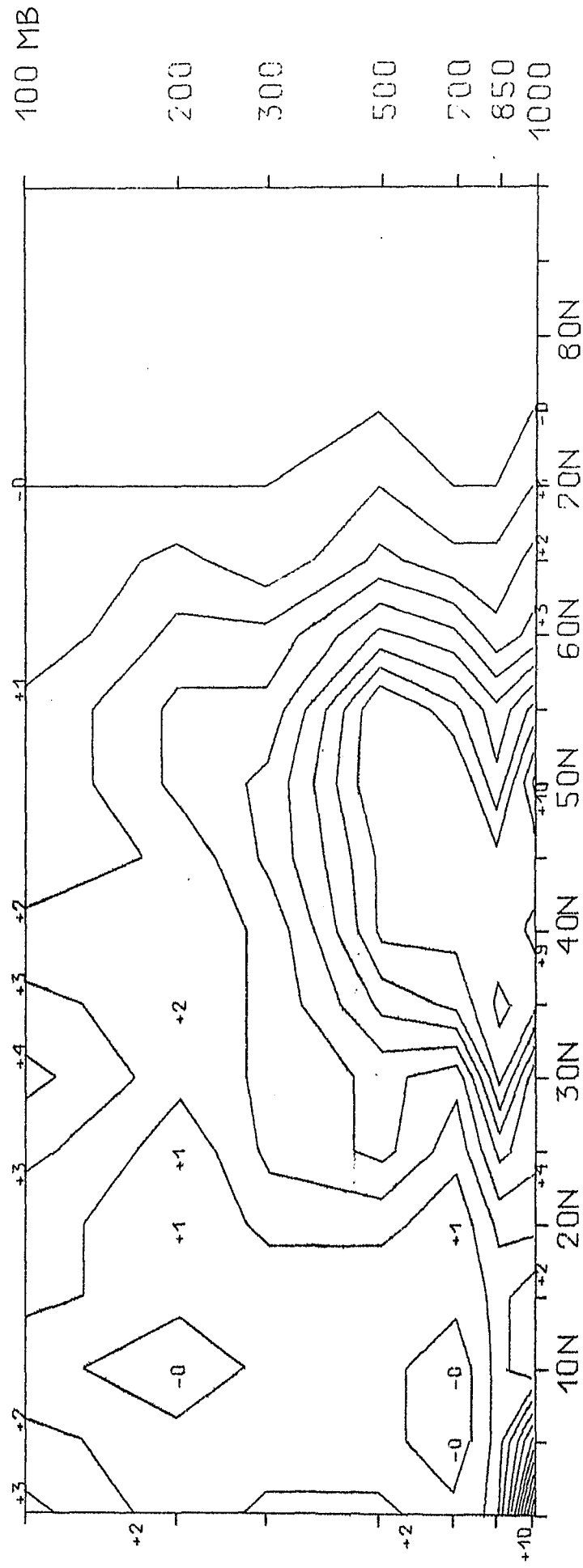
KENNZIFFER: 39107100



$A_{MSE, 4 - 8} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.71}$

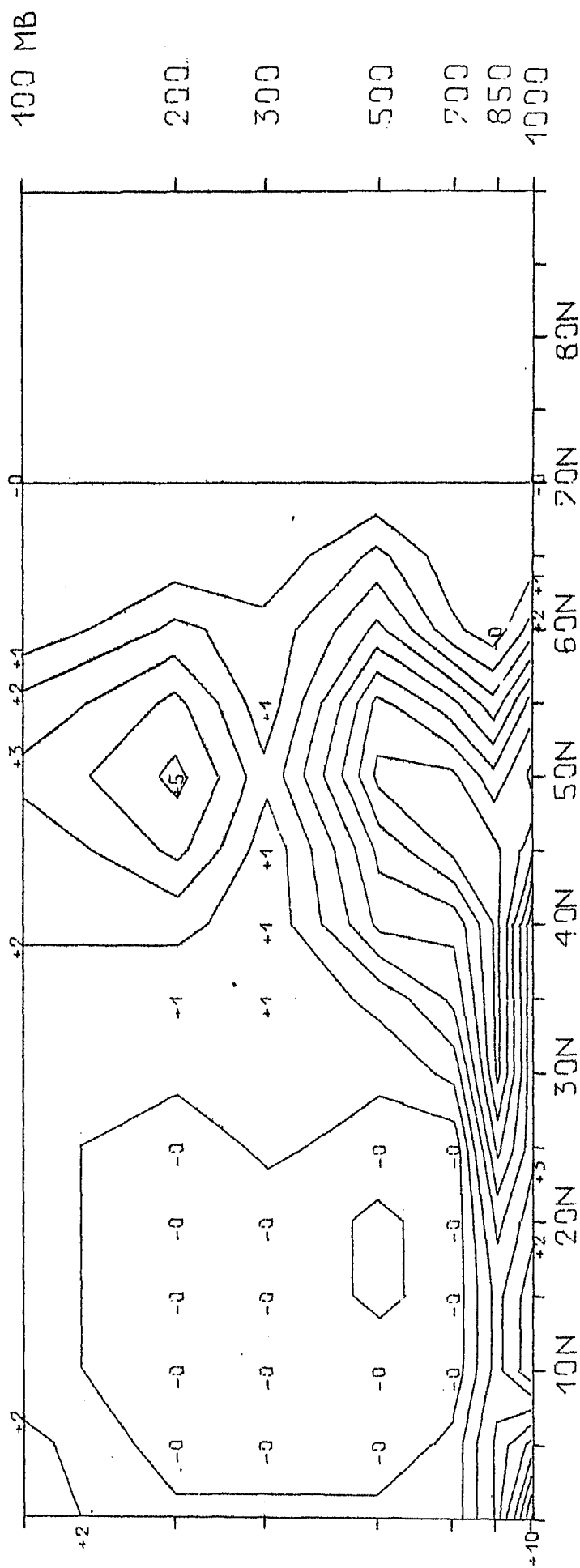
Abb.77

KENNZIFFER: 39107200



$A_{MSE: 4 - 8} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.72}$

KENNZIFFER: 39107300

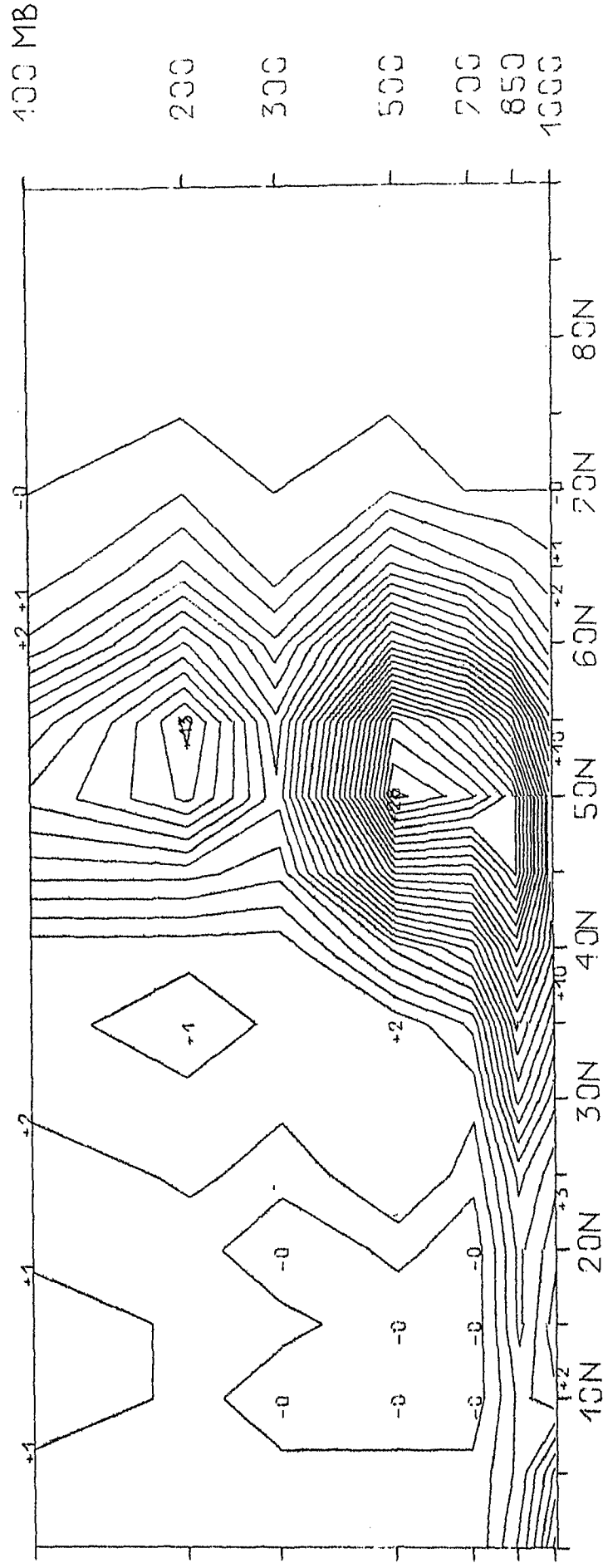


$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.73}$

$A_{\text{MSE}, 4 - 8}$

Abb.79

KENNZIFFER 39107400

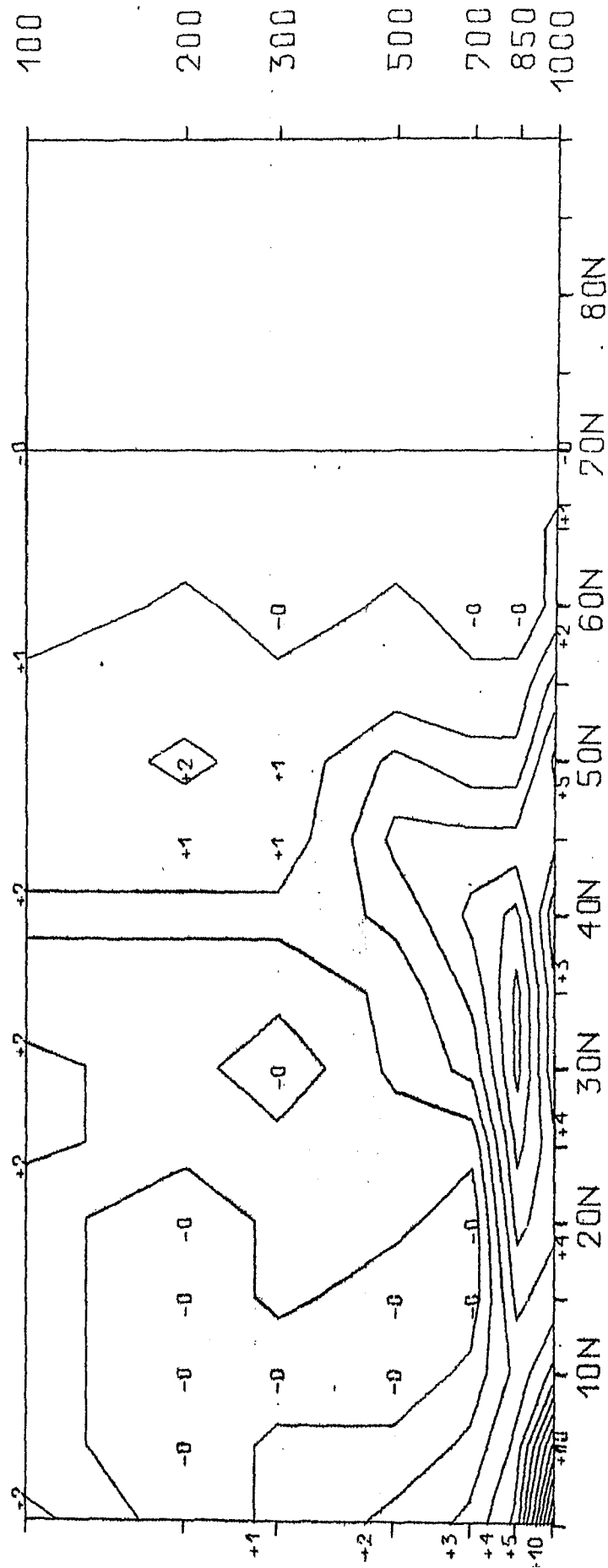


$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.74}$

$R_{\text{MSE}, 4 - 6}$

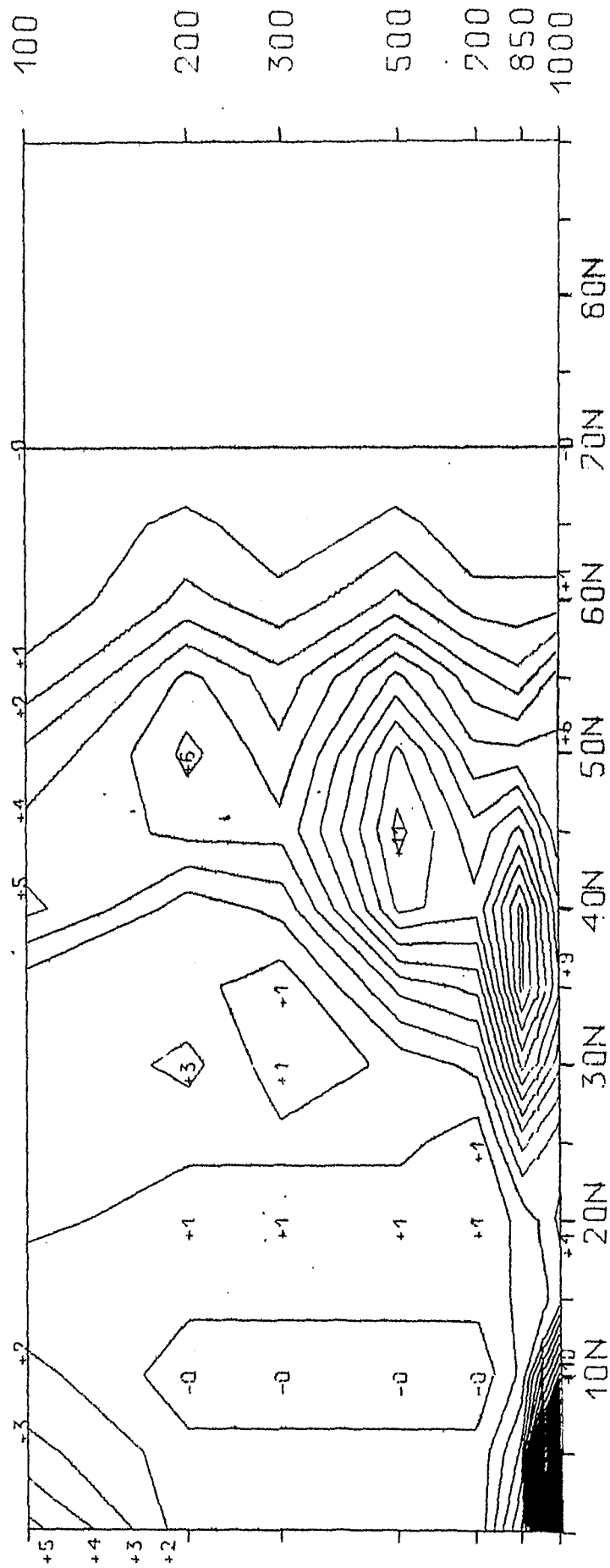
Abb.80

KENNZIFFER: 39107500



$A_{MSE} 4 - 8$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT. 75

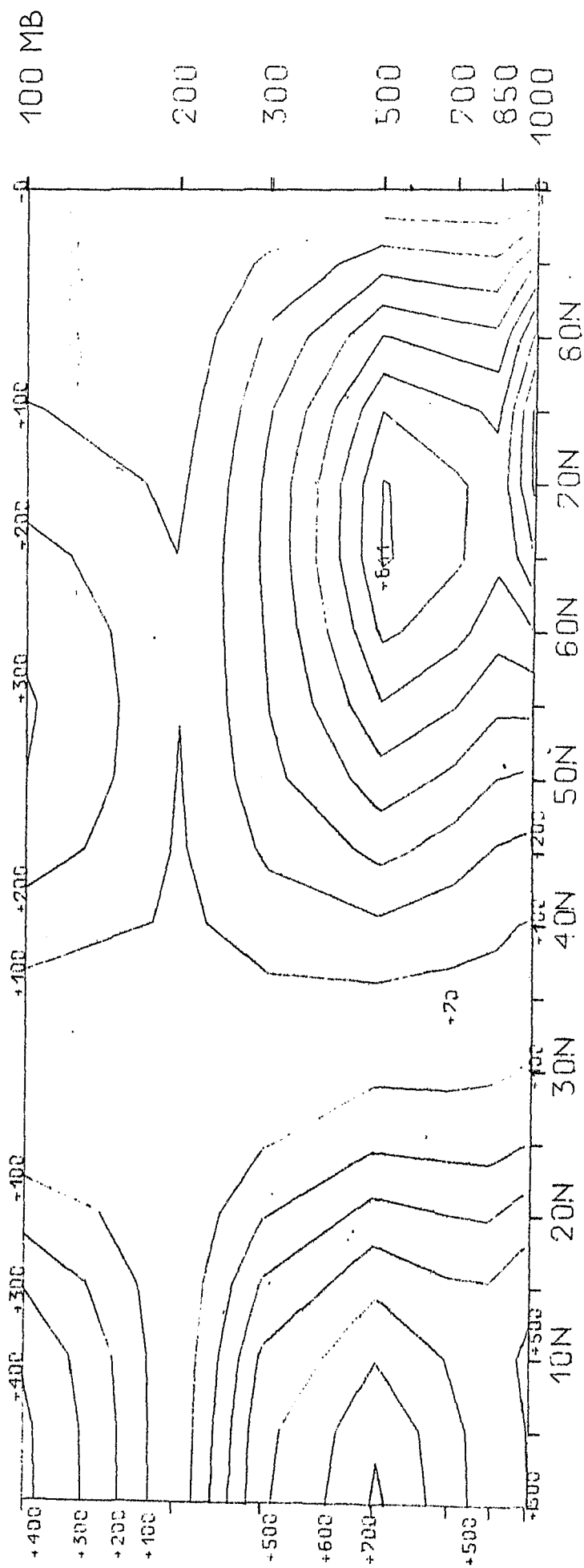
KENNZIFFER: 39107600



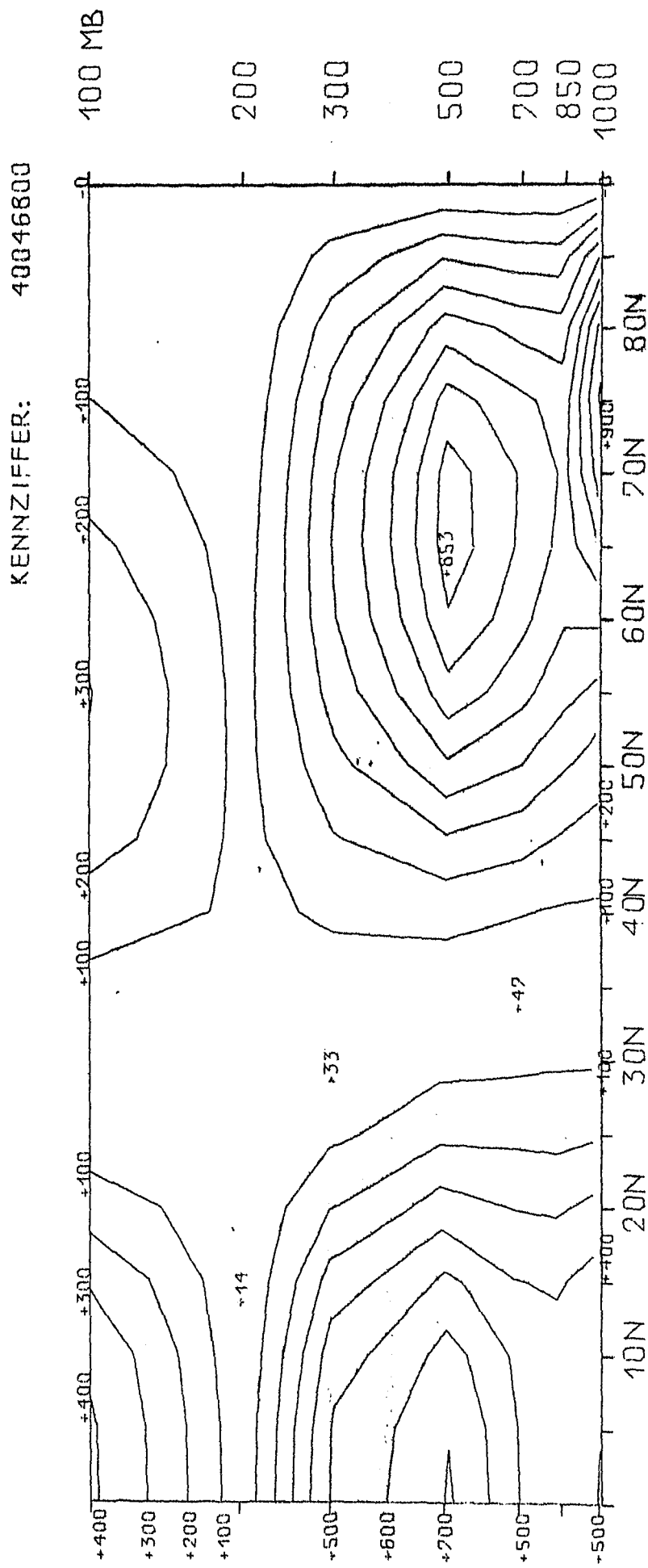
$A_{MSE} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT. 76

Abb. 80 b

KENNZIFFER: 40046700

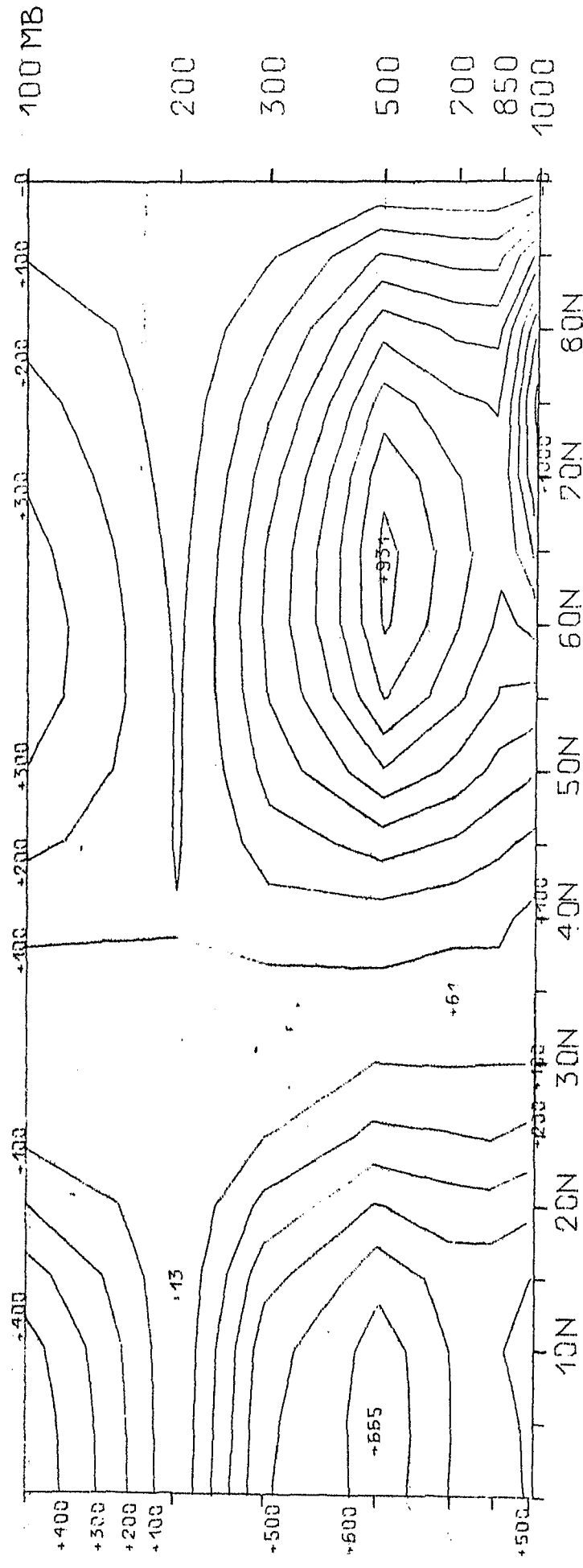


A_{roc} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 67



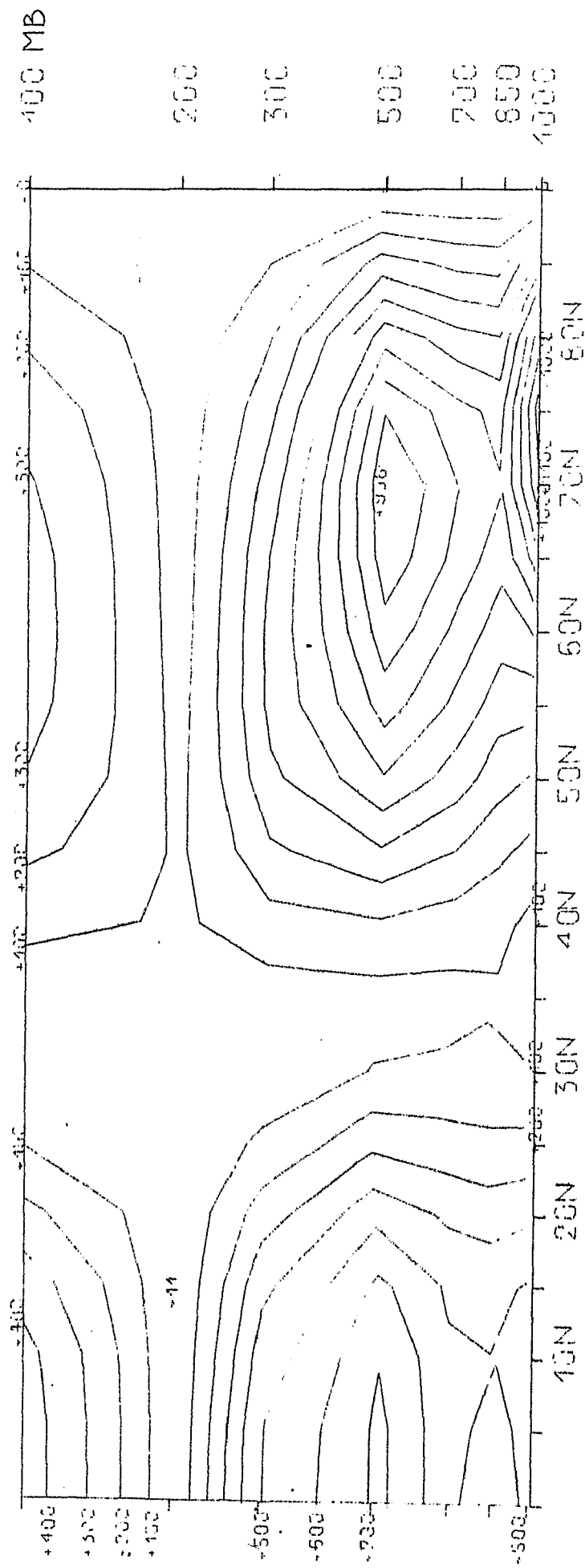
A_{roc} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 68

KENNZIFFER. 40046900



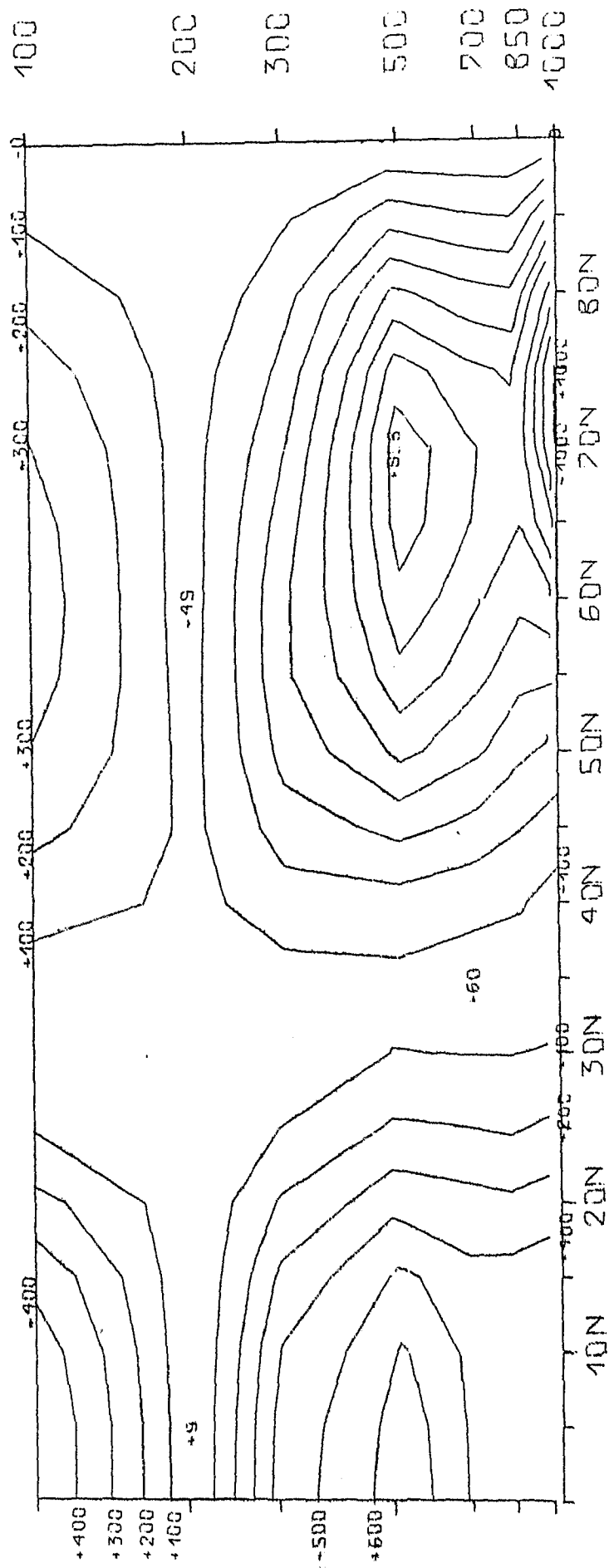
$A_{\text{TOC}} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 69

KENNZIFFER: 40047000



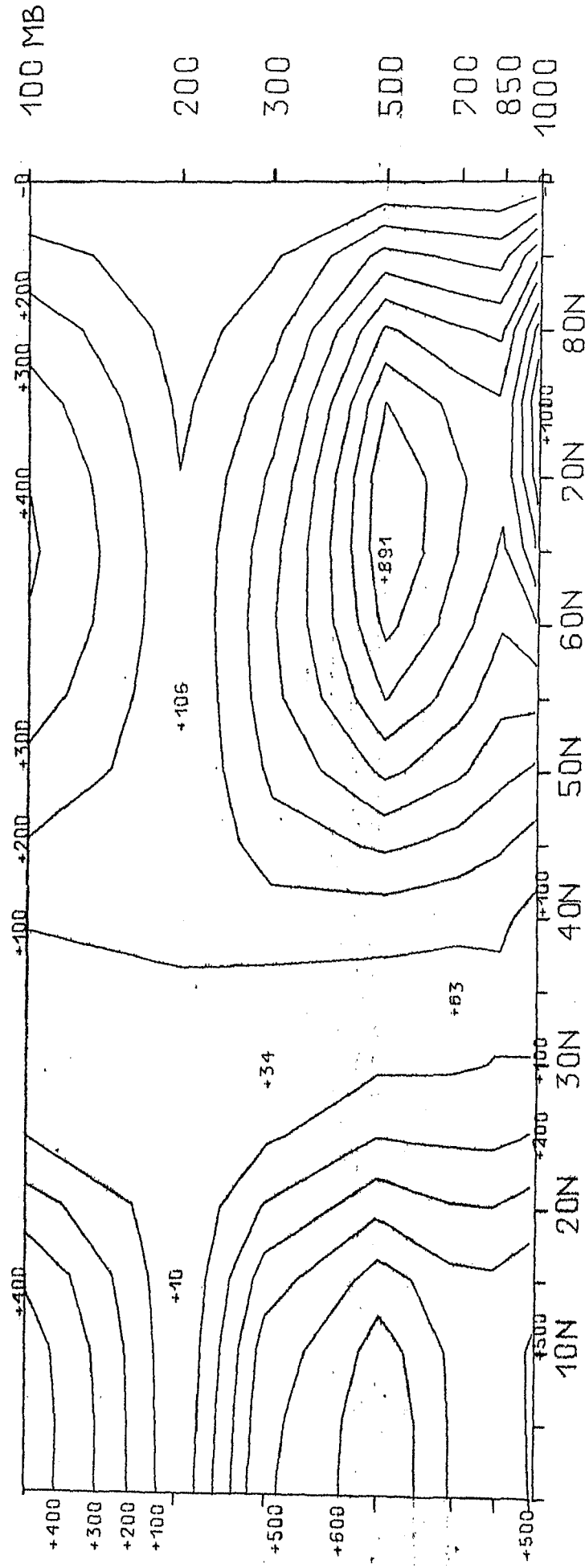
$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 70

KENNZIFFER. 40047100



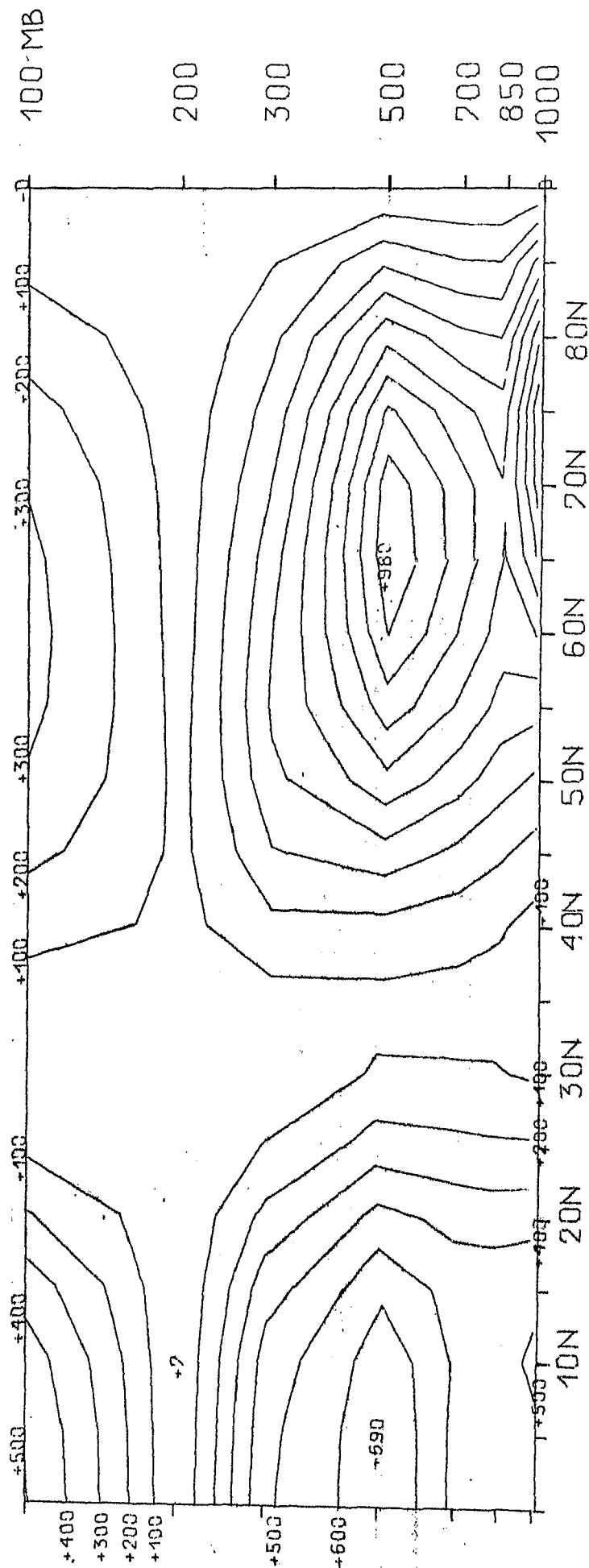
A_{0c} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 71

KENNZIFFER: 40047200



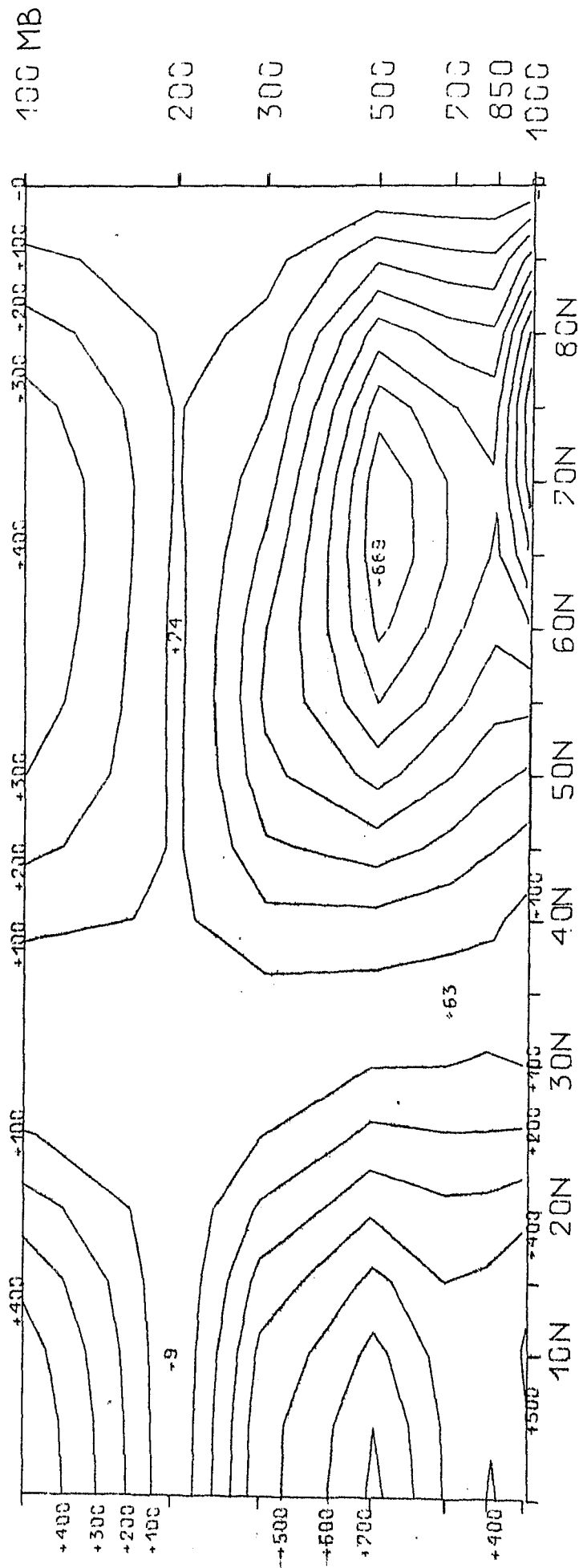
A_{TOC} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 72

KENNZIFFER: 40042300



A_{100} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 73

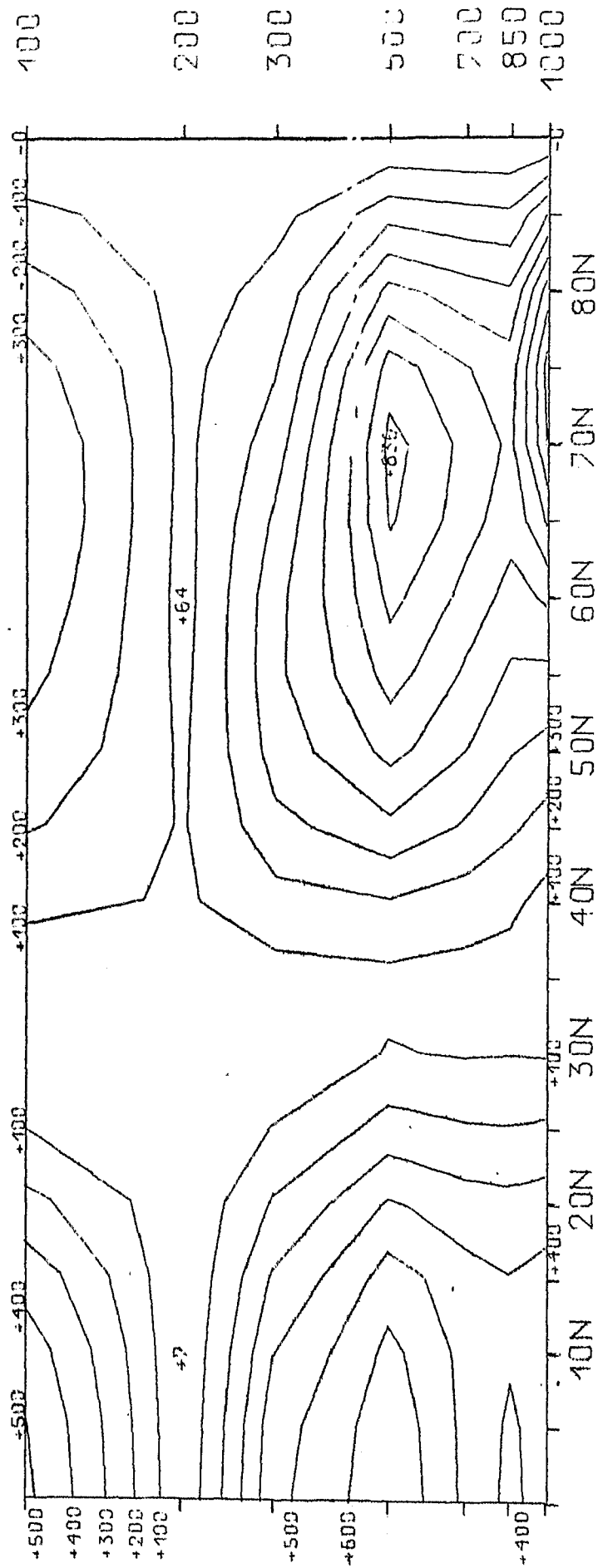
KENNZIFFER: 40047400



$A_{\text{TOC}} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 74

Abb.88

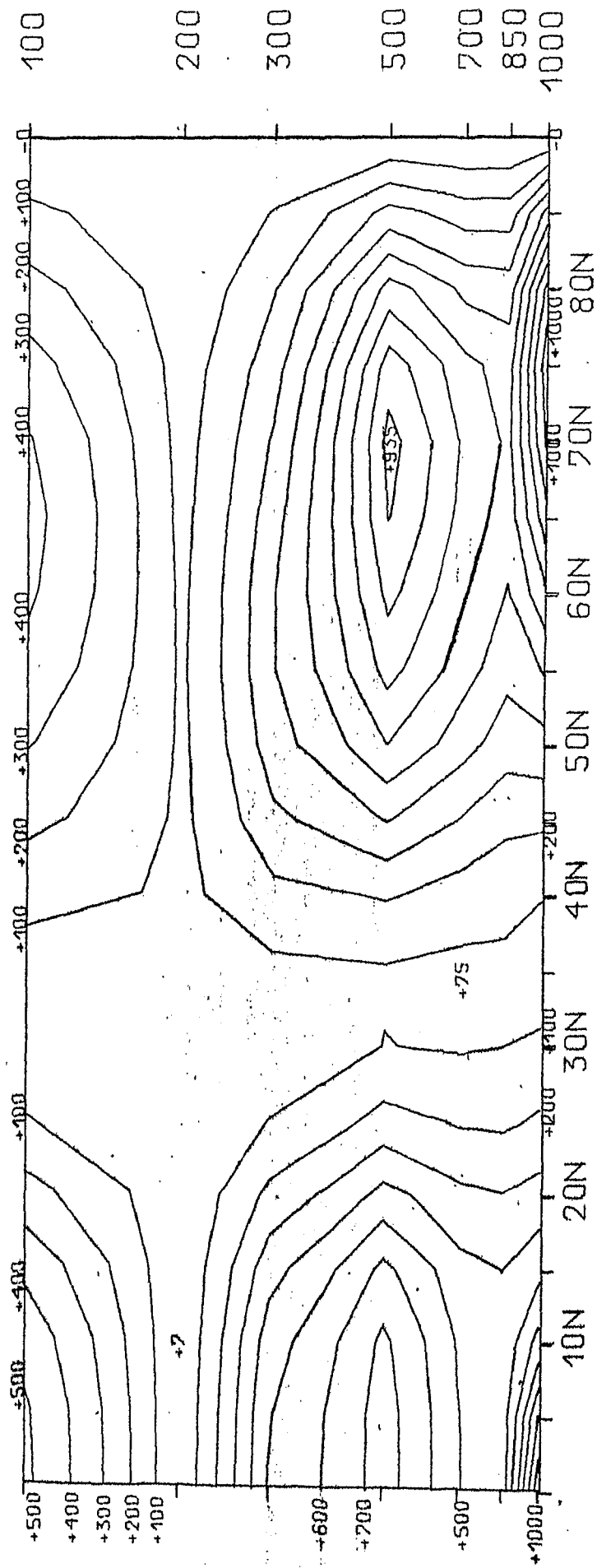
KENNZIFFER: 40047500



A_{TOC} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 75

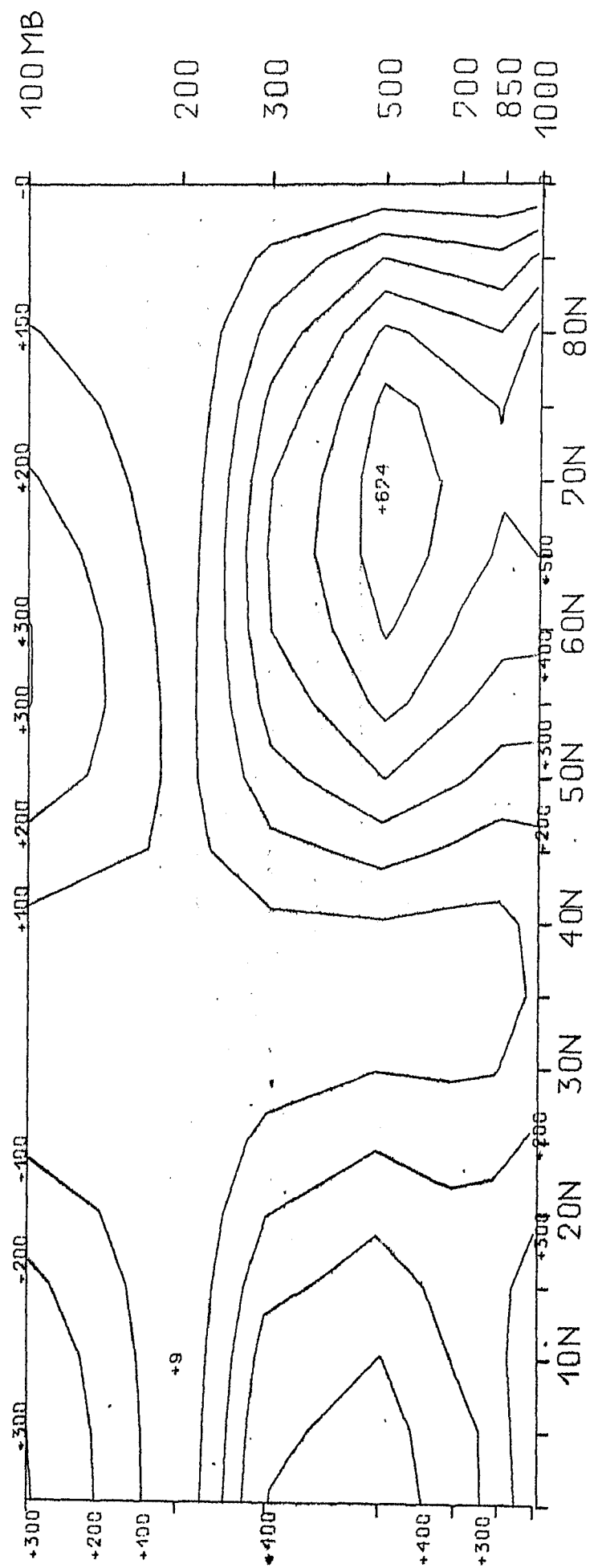
Abb.88 a

-40047600



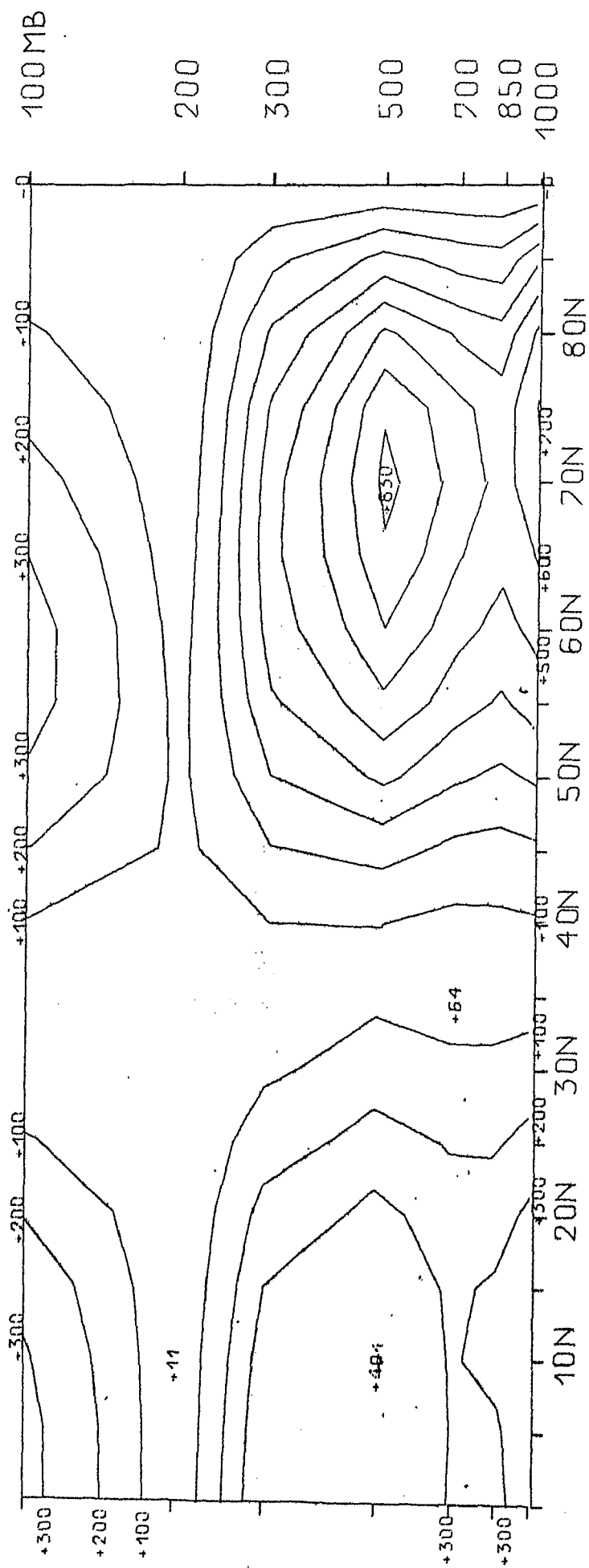
A_{roc} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 76

KENNZIFFER: 40106700



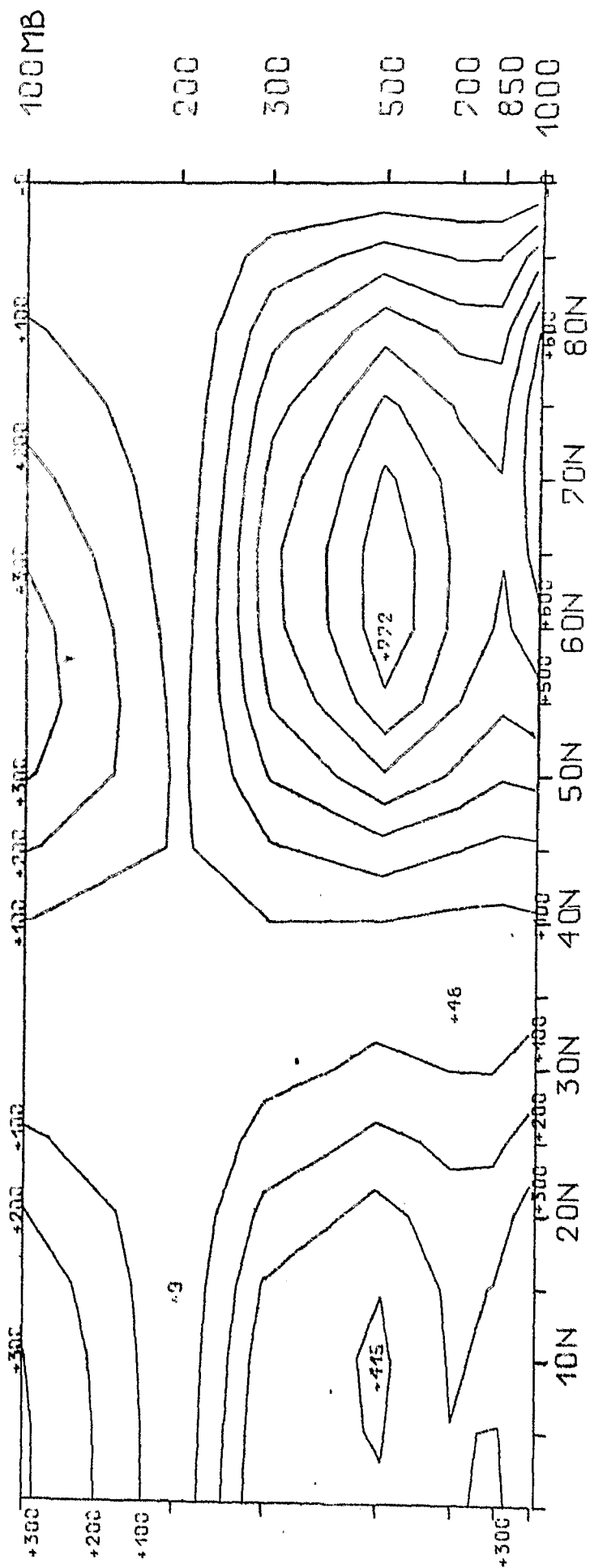
A_{TOC} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT.67

KENNZIFFER: 4Q106800



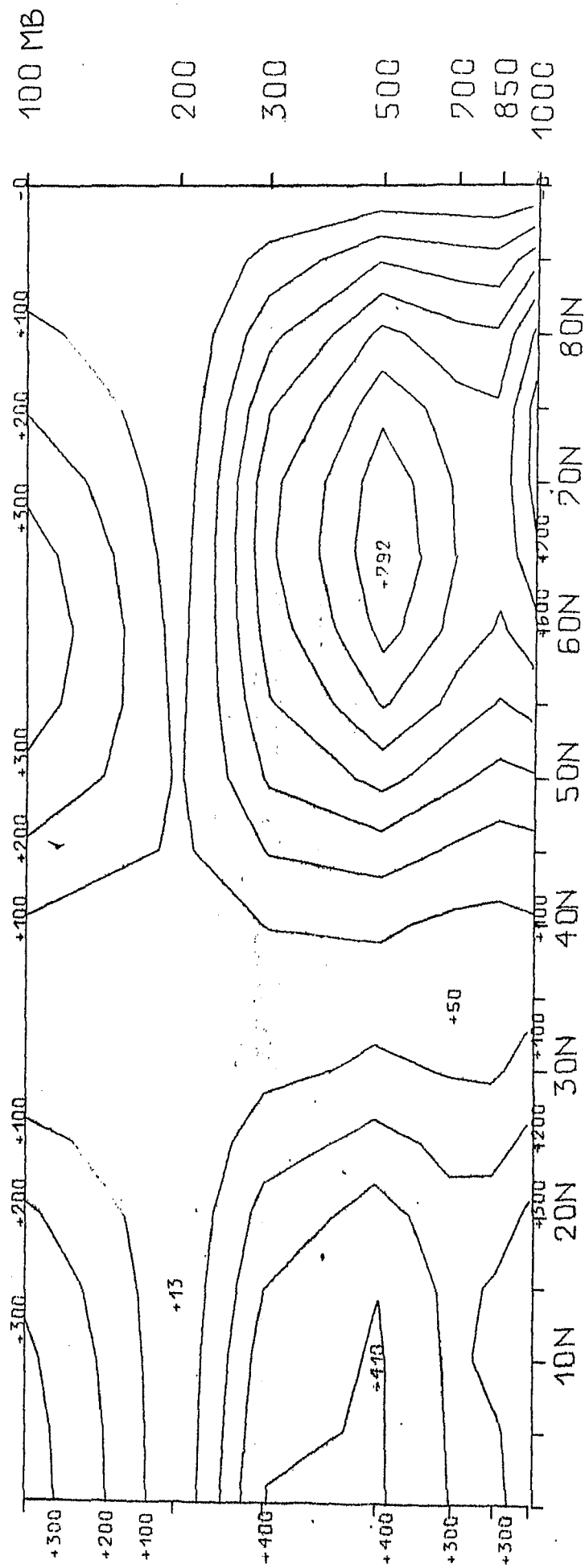
$A_{\tau_{OC}}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT.68

KENNEDY: 40106900



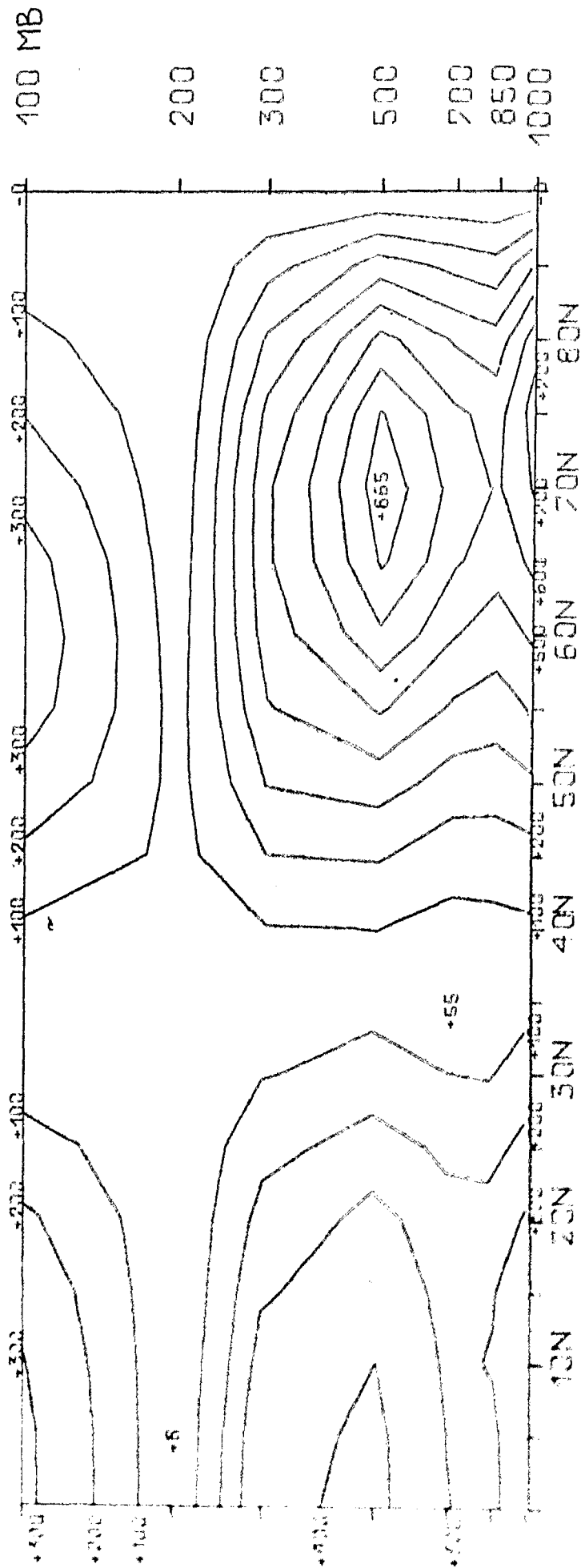
A_{100} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT.69

KENNZIFFER: 40102000



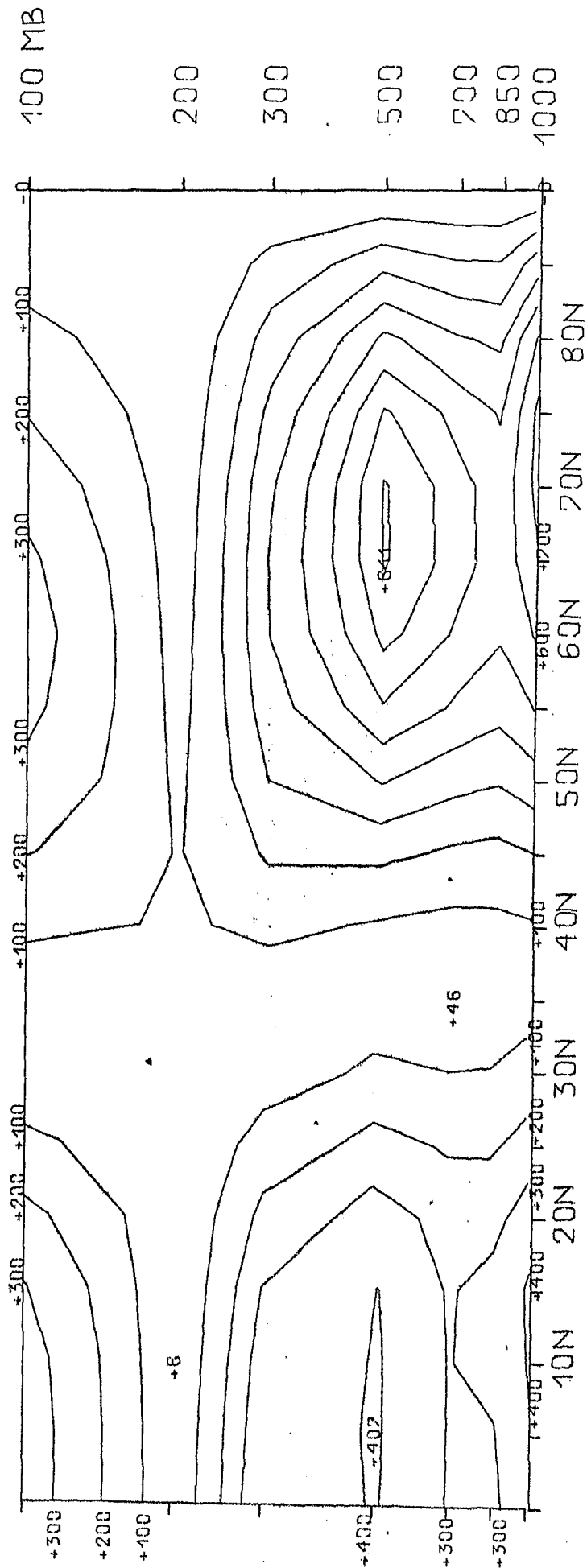
A_{TOC} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT.70

KENNZIFFER: 40107100



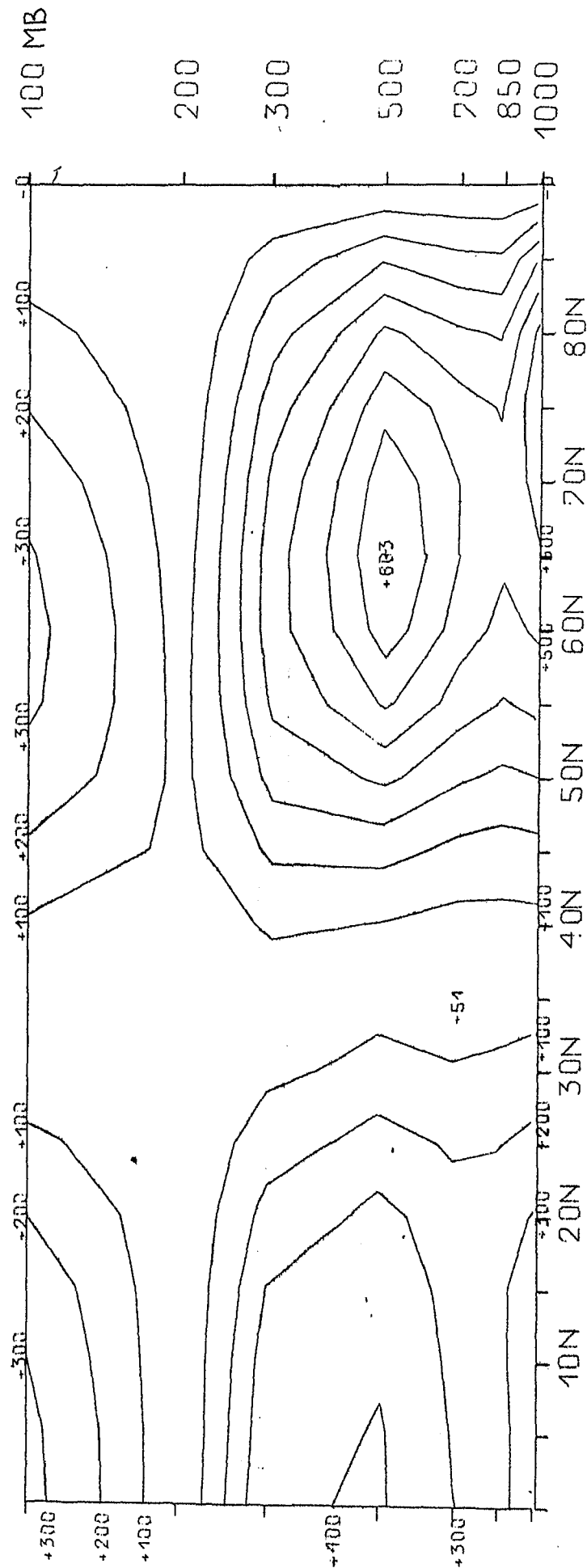
$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.71}$

KENNZIFFER: 40107200



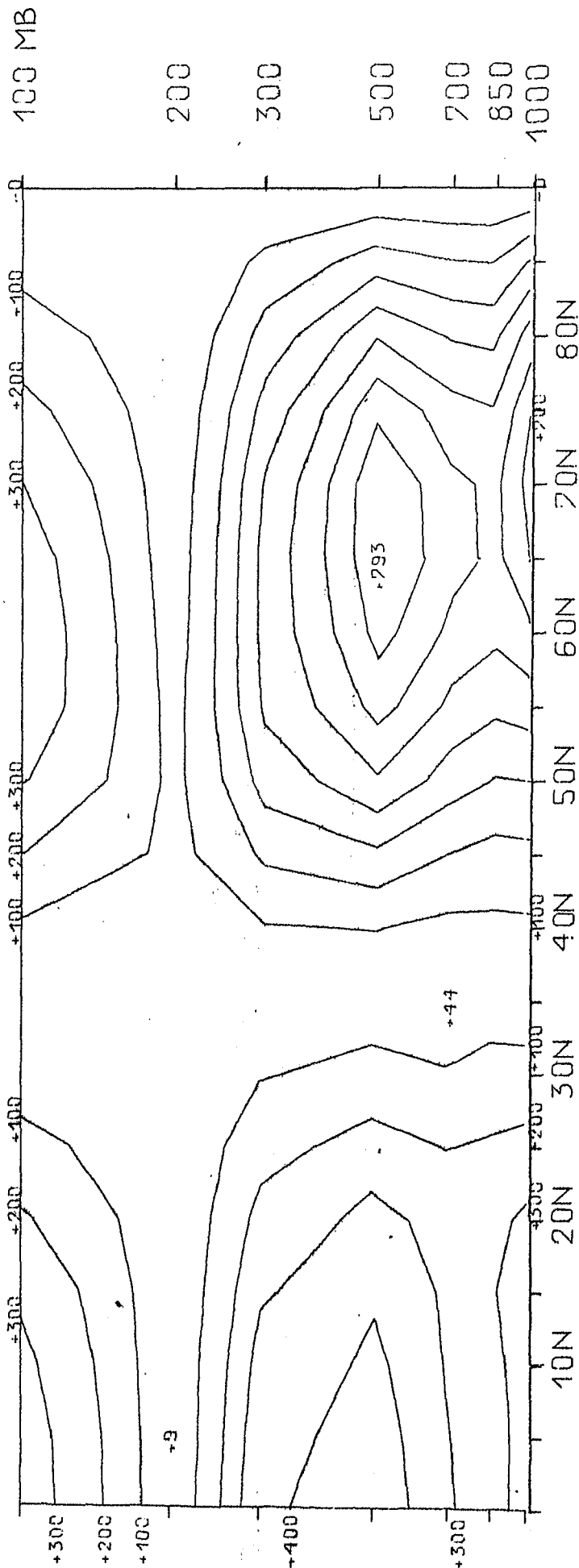
$A_{\text{TOC}} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.72}$

KENNZIFFER: 40107300.



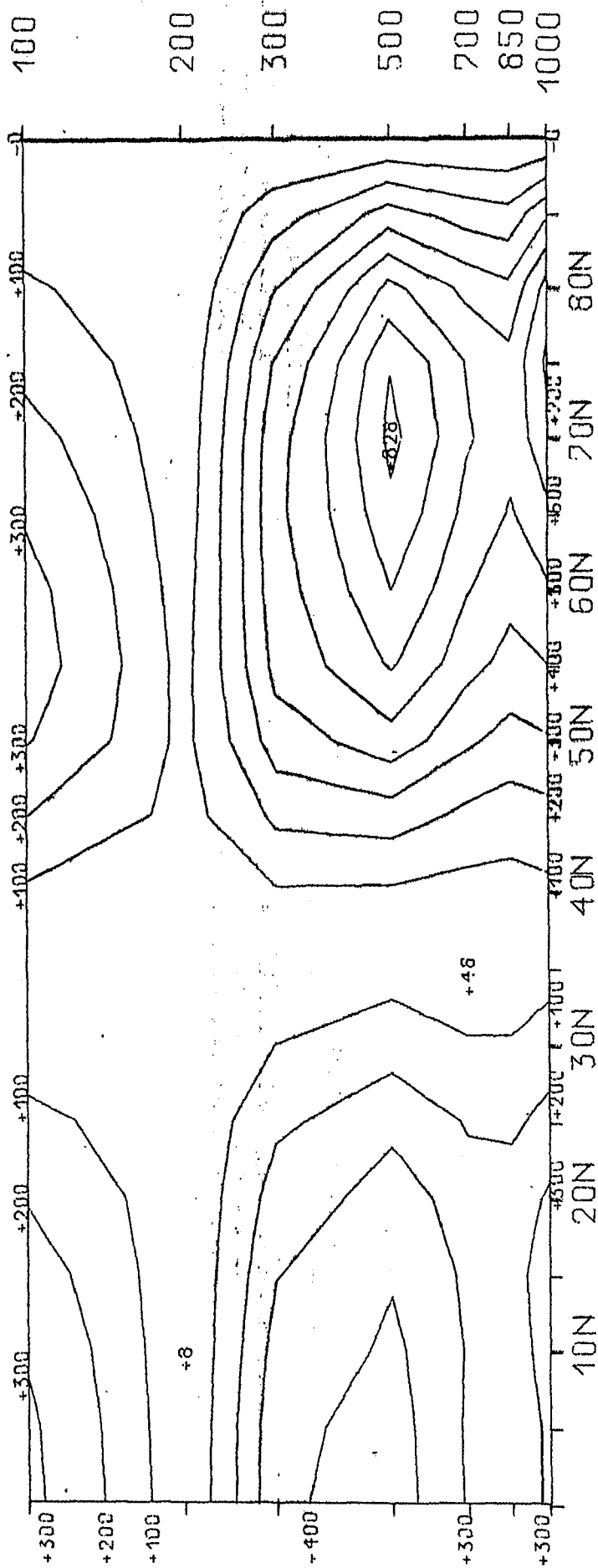
$F_{\tau_{OC}}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.73}$

KENNZIFFER: 40107400



A_{TOC} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.74}$

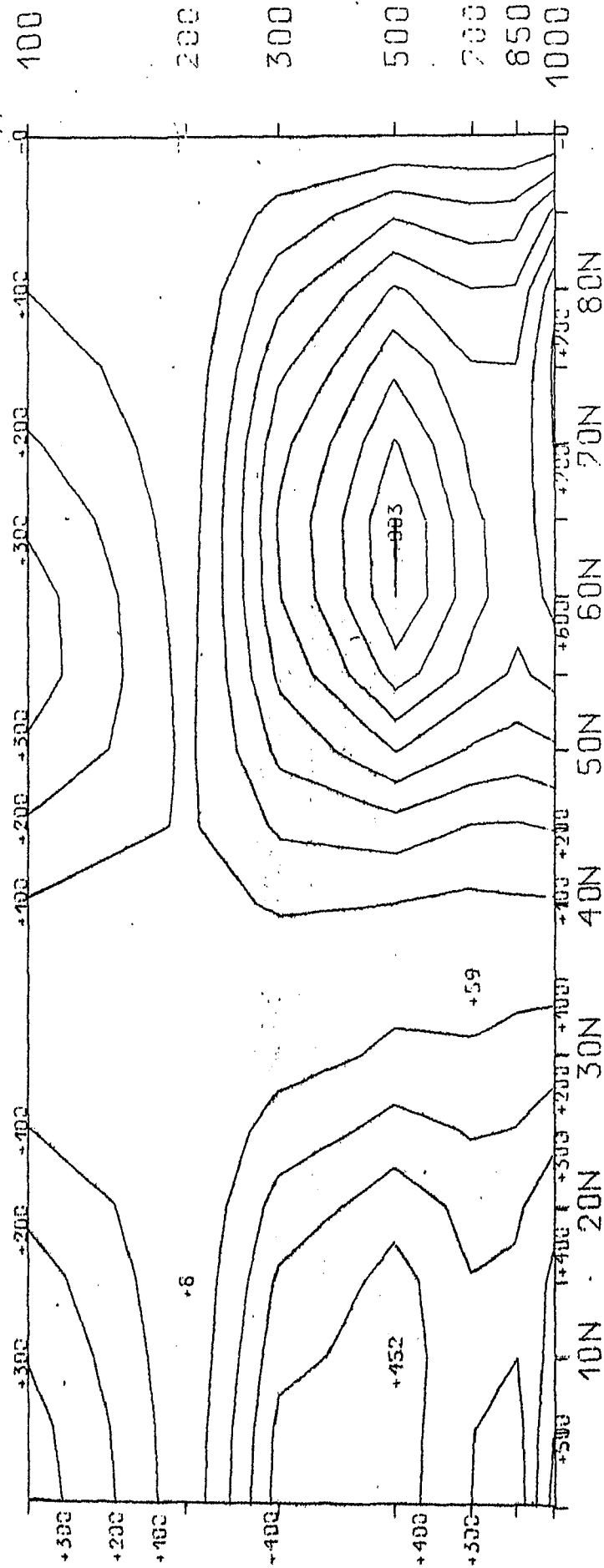
KENNZIFFER: 40107500



A_{TOC} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT. 75

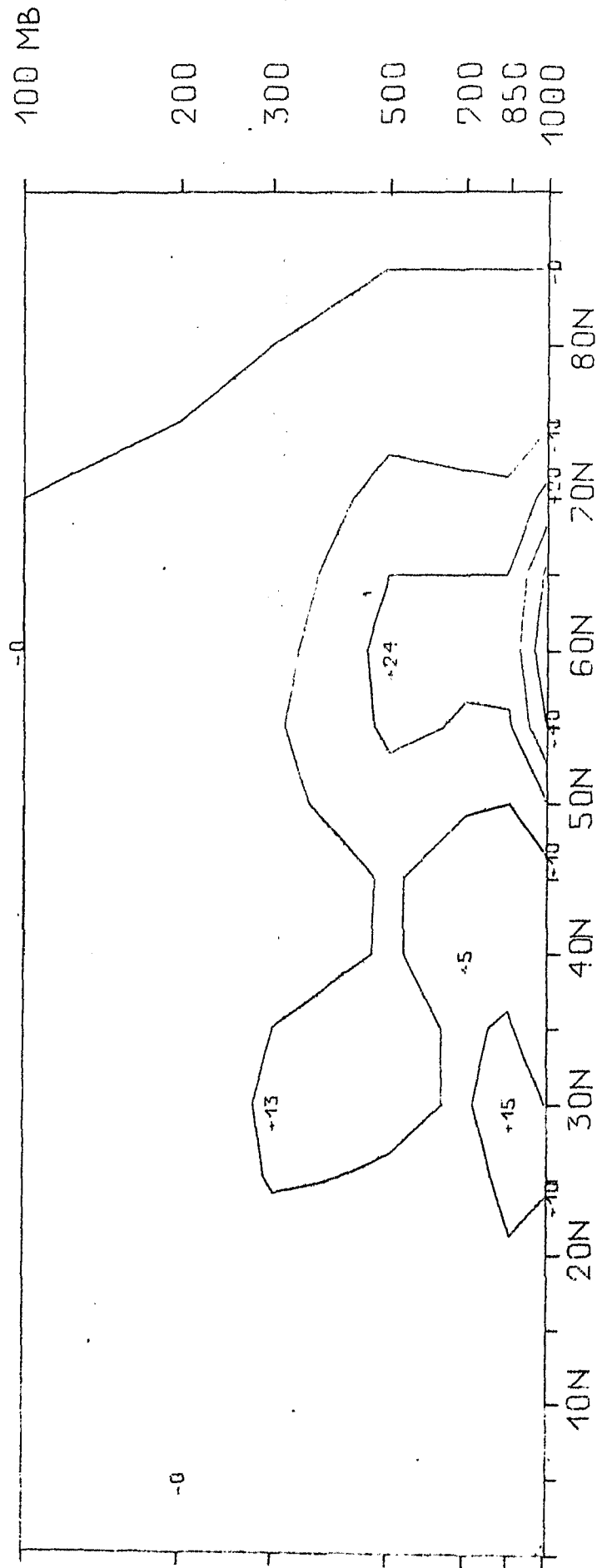
Abb. 96a

KENNZIFFER: 40107600



A_{700} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT.76

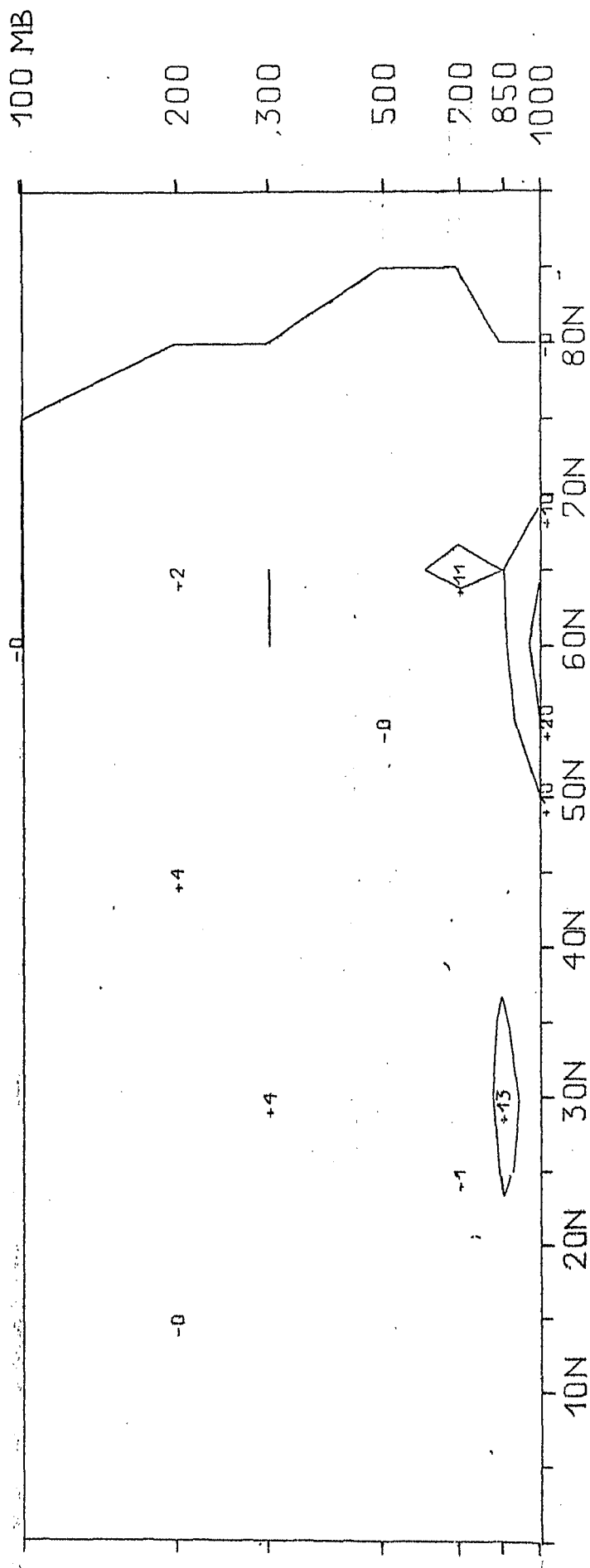
KENNZIFFER: 42046700



$A_{MSE, 2-3}$

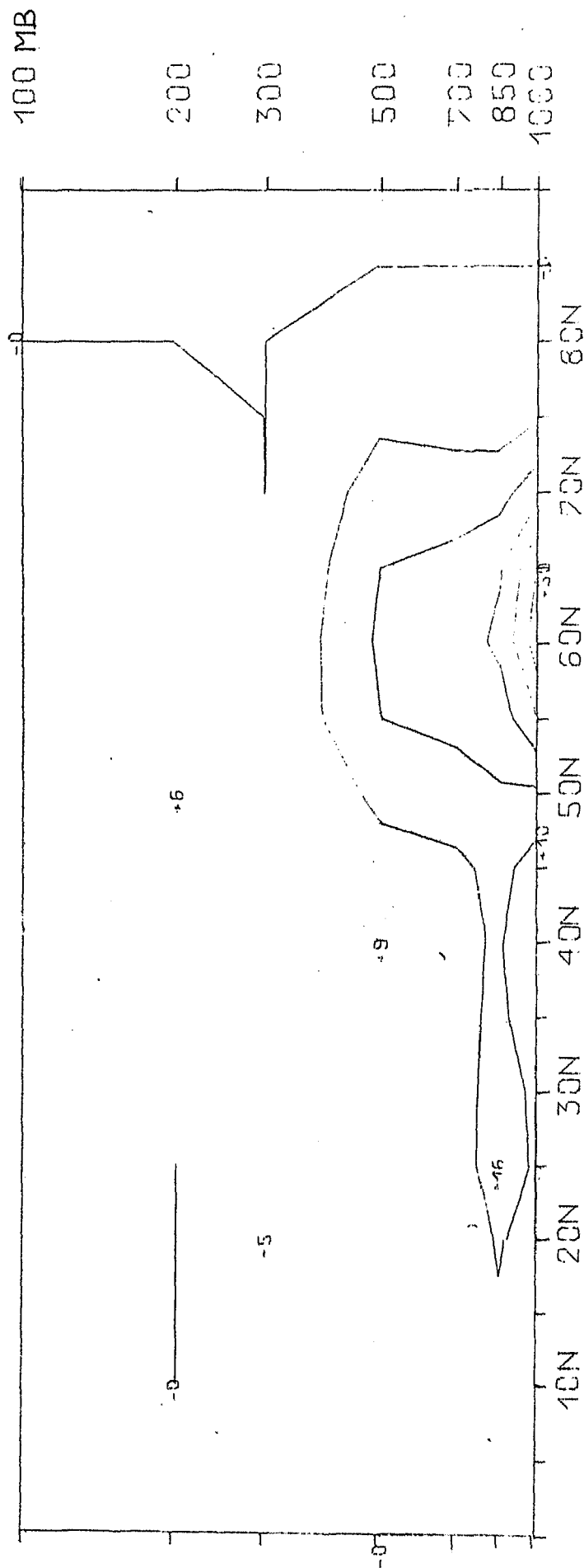
$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 67

KENNZIFFER: 42046800



A_{MSE, 2' - 3'} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 68

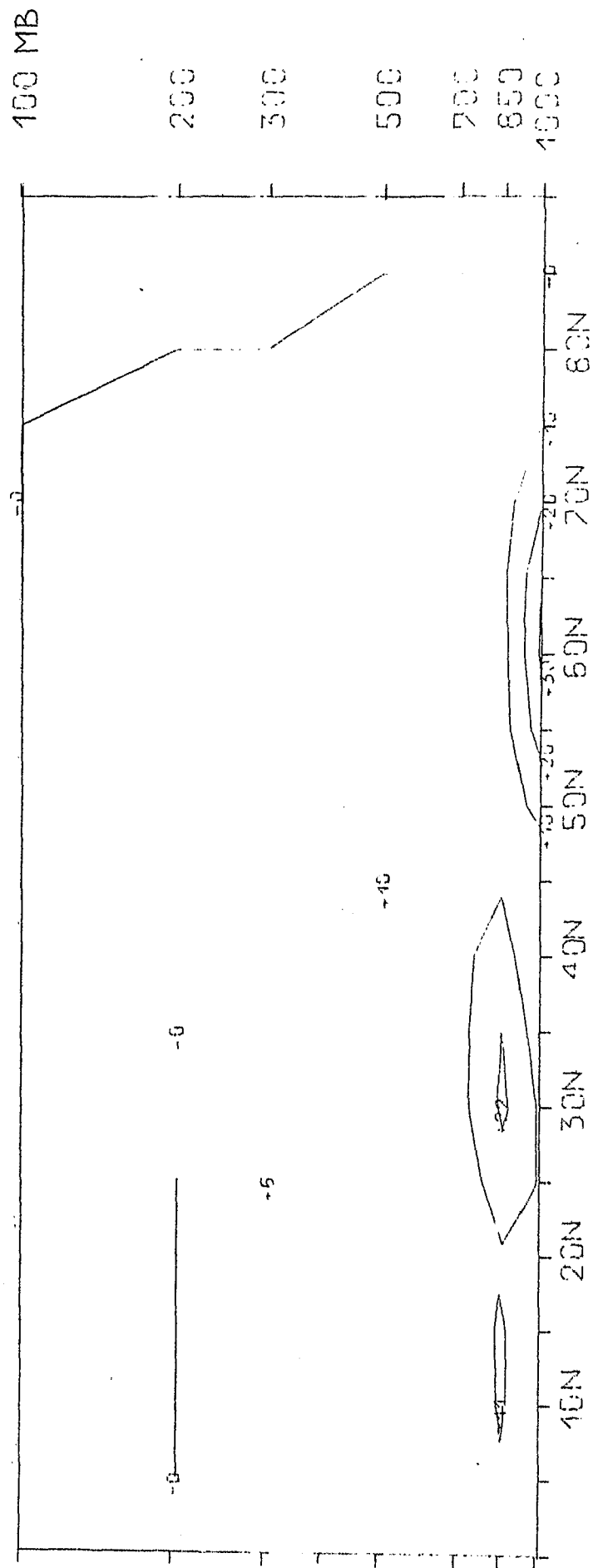
KENNZIFFER: 42046900



$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 69

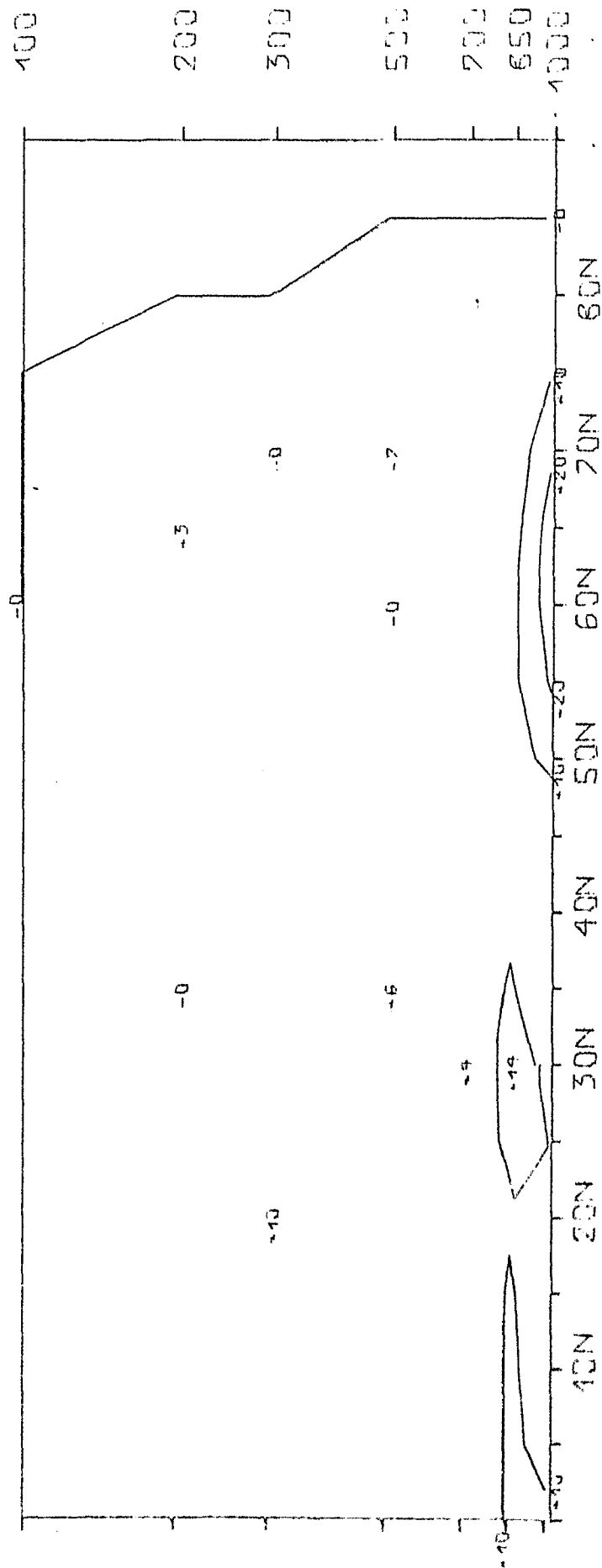
A MSE + 2 - - 3

KENNZEICHEN: 42047000



$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 70

KENNZIFFER: 42047100

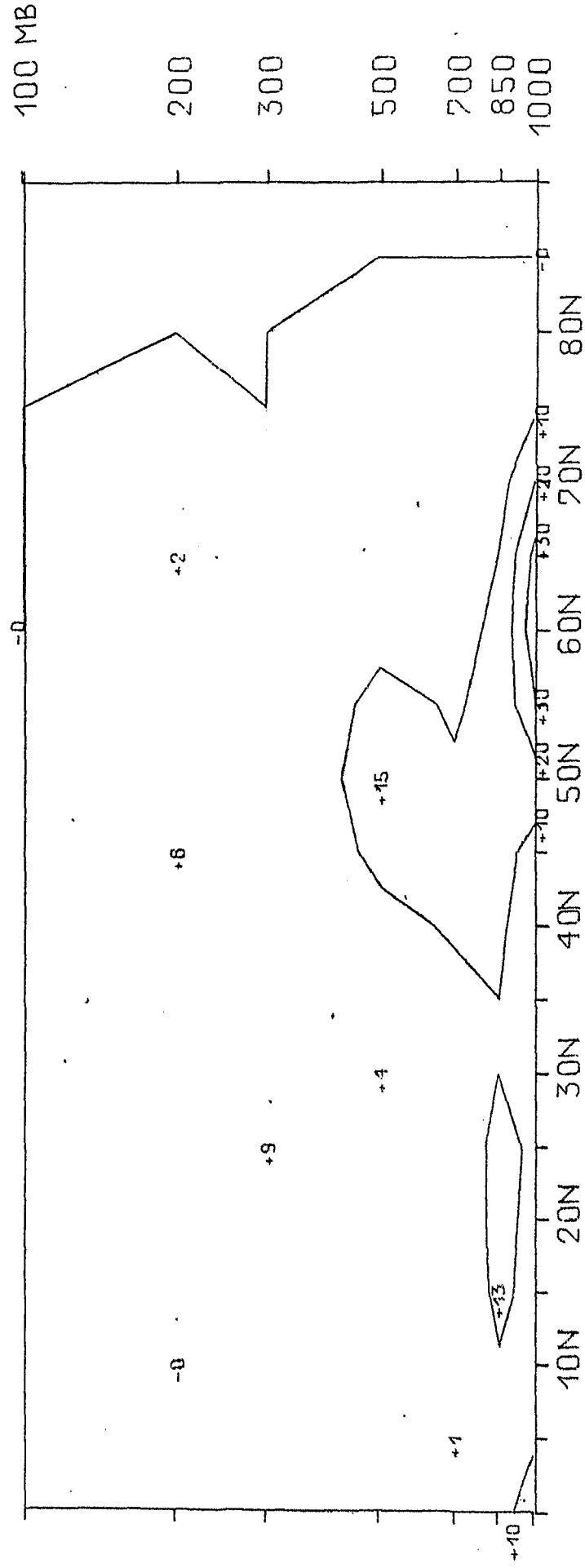


10⁻³ J CM⁻² MB⁻¹

APRIL 71

A
MSE: 3.3 - 3
 10^{-3} J CM $^{-2}$ MB $^{-1}$ APRIL 72

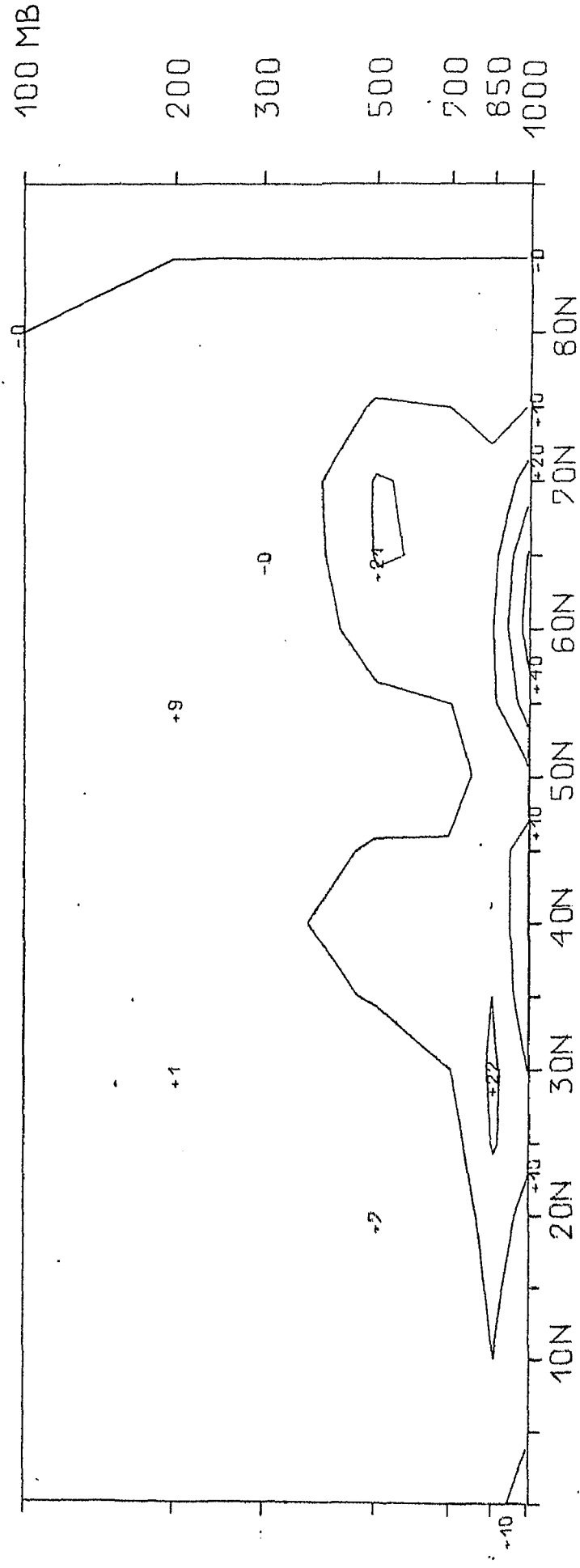
KENNZIFFER: 42047300



$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 73

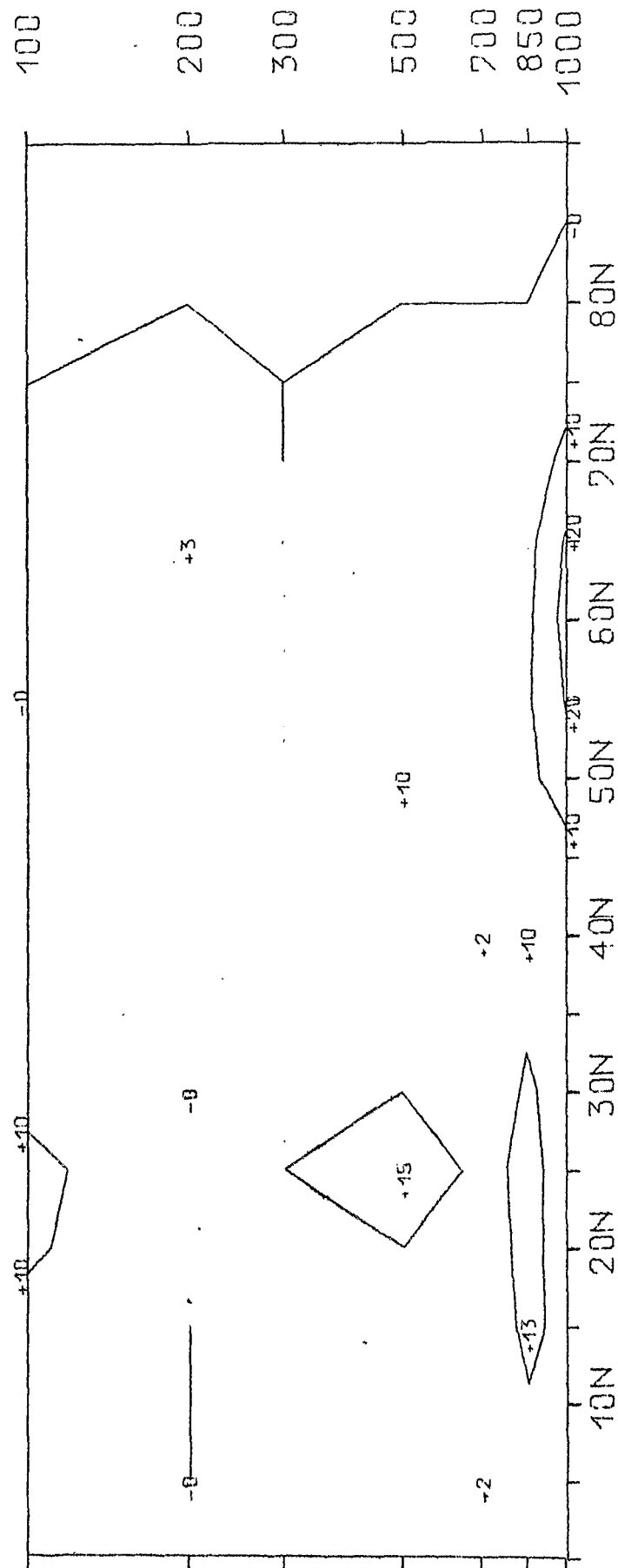
A_{MSE, 2 - 3}

KENNZIFFER: 42047400



$\bar{A}_{MSE. 2 - 3} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 74

KENNZIFFER: 42047500

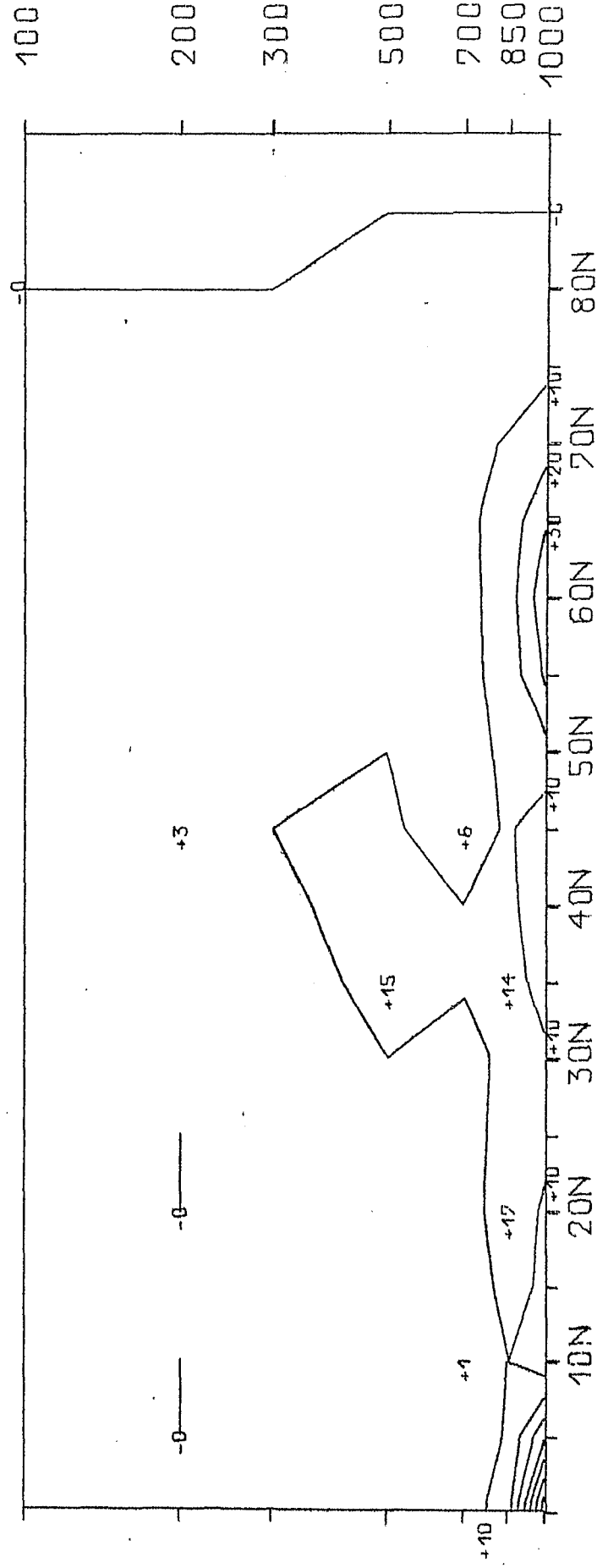


$A_{SE, 2-3} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$

APRIL 75

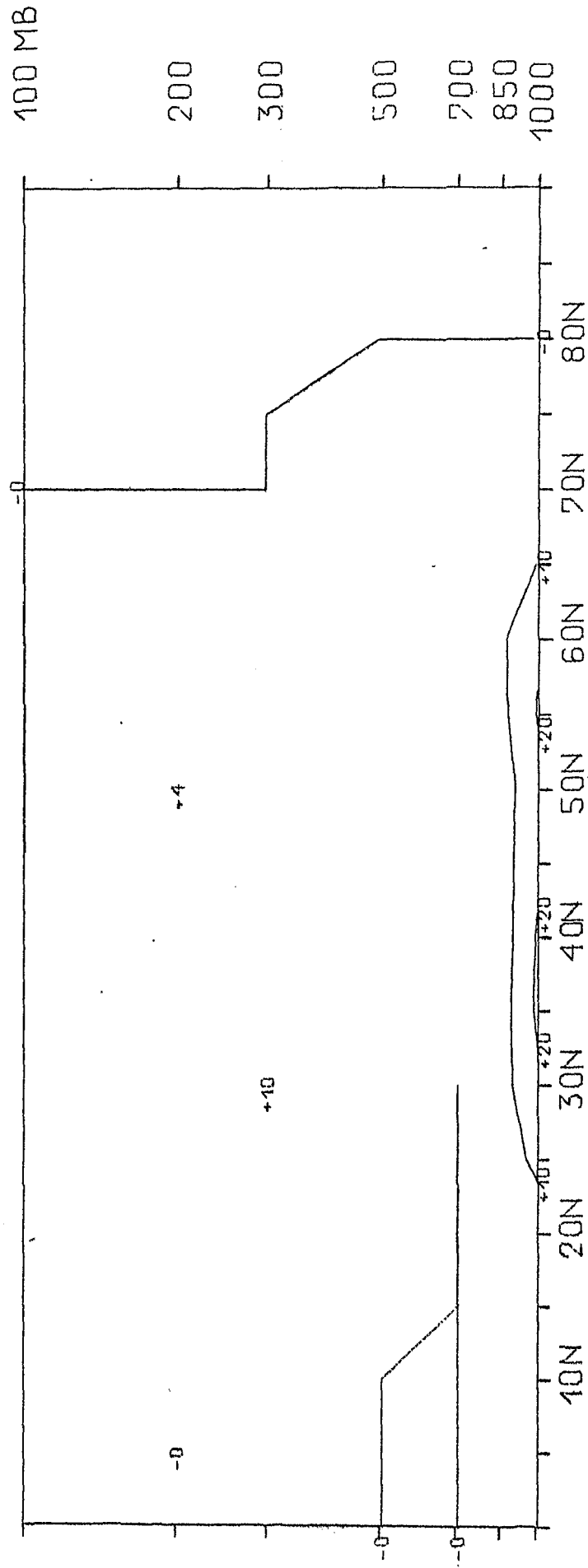
Abb.104a

KENNZIFFER: 42047600



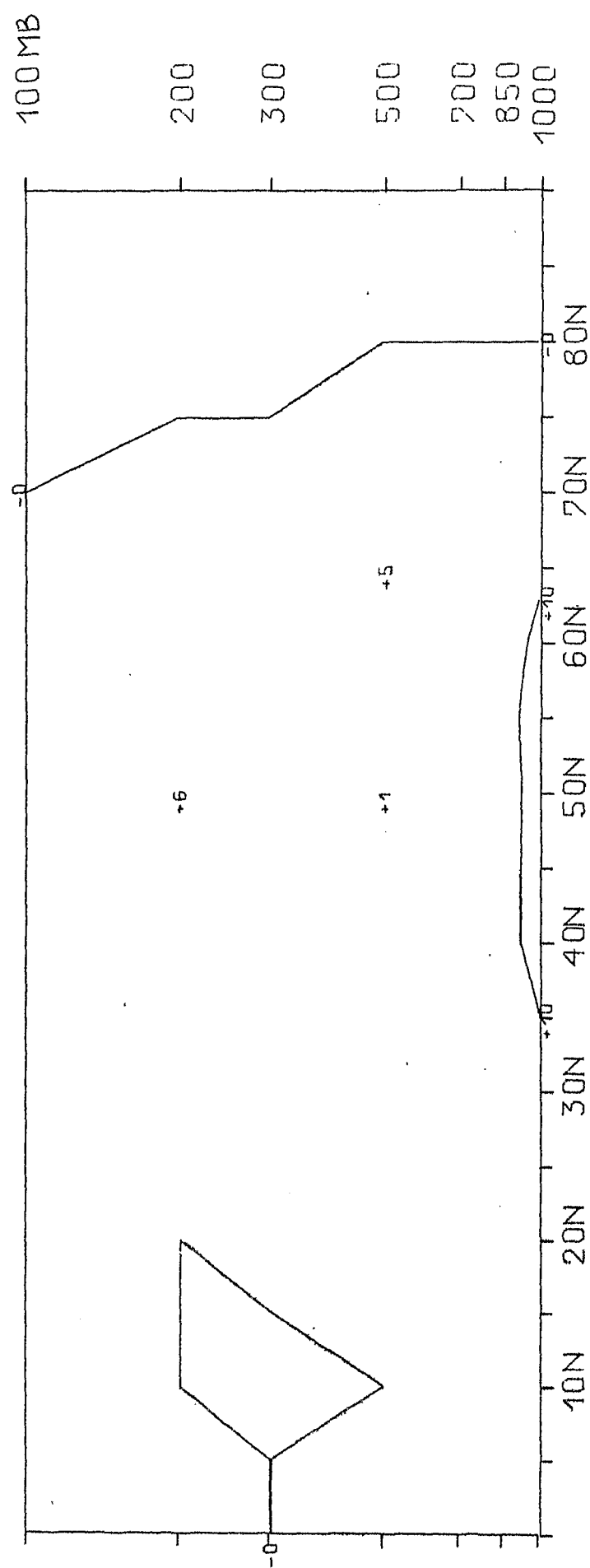
$A_{MSE, 2-3}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 76

KENNZIFFER: 42106700



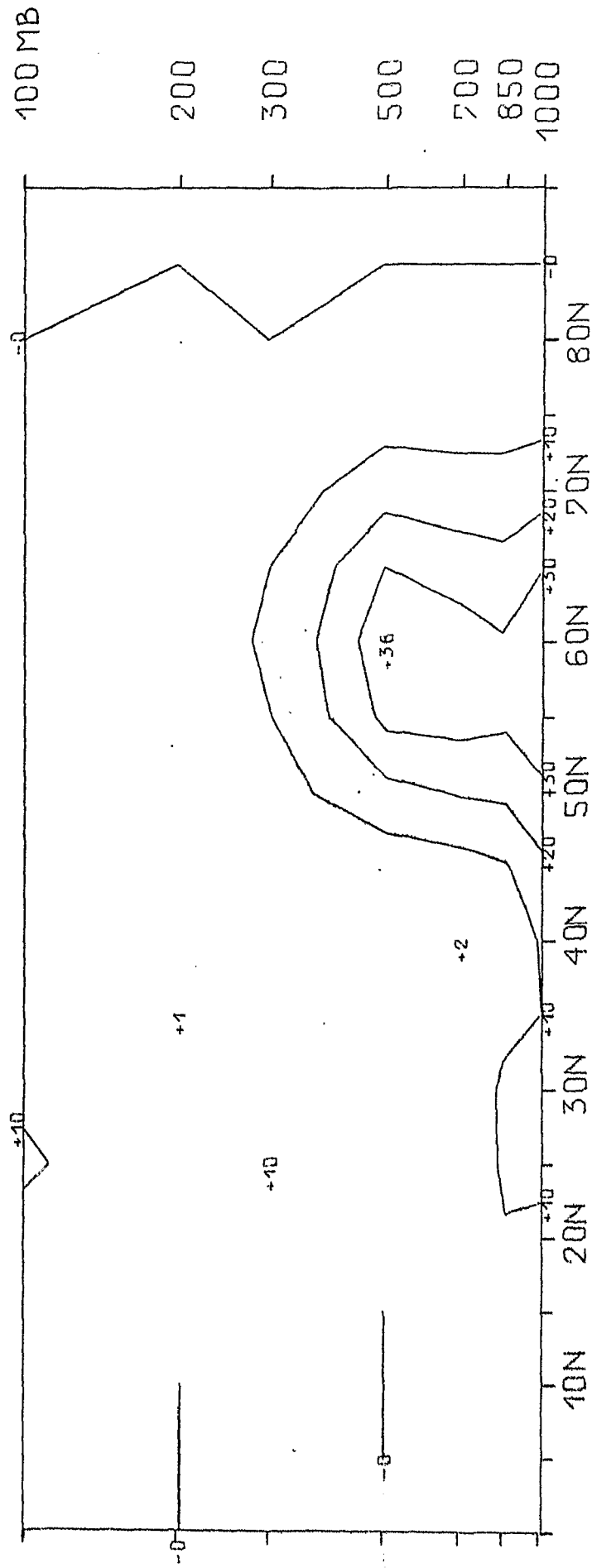
$A_{MSE, 2-3} 10^{-3} J CM^{-2} MB^{-1} OKT.67$

KENNZIFFER: 42106800



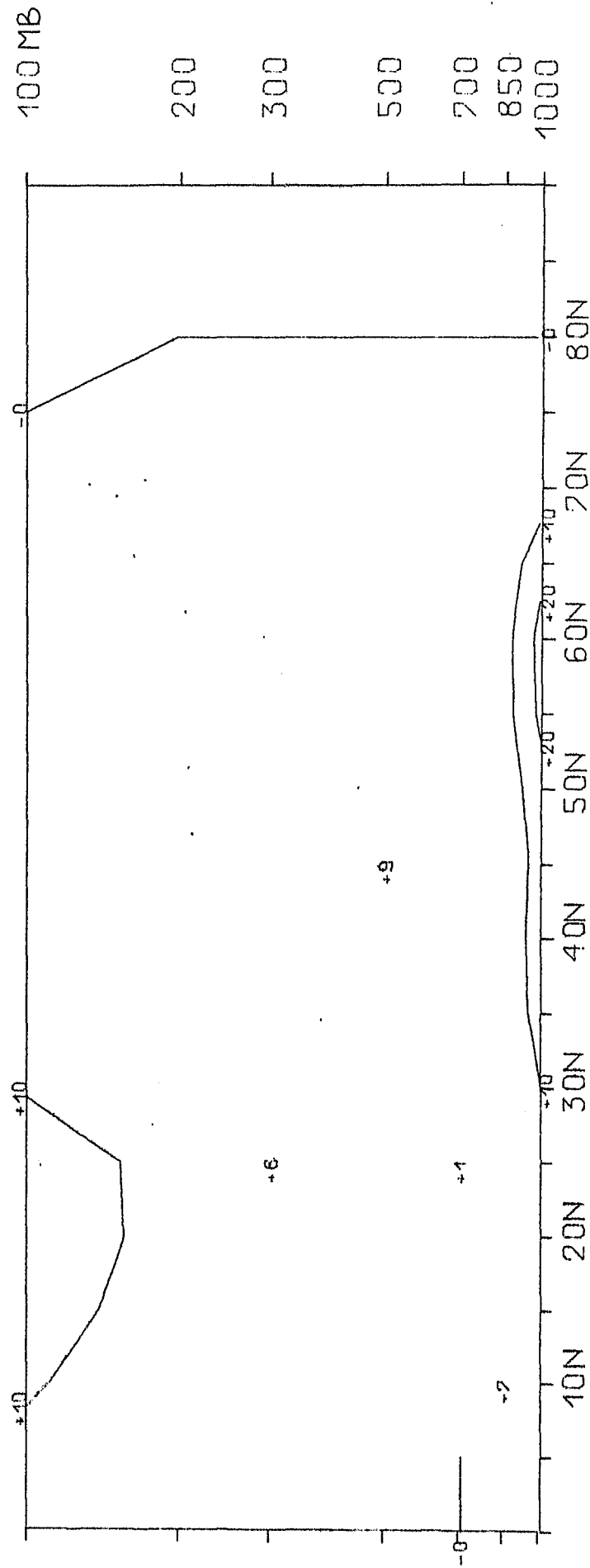
$A_{MSE, 2-3} 10^{-3} J CM^{-2} MB^{-1} OKT.68$

KENNZIFFER: 42106900



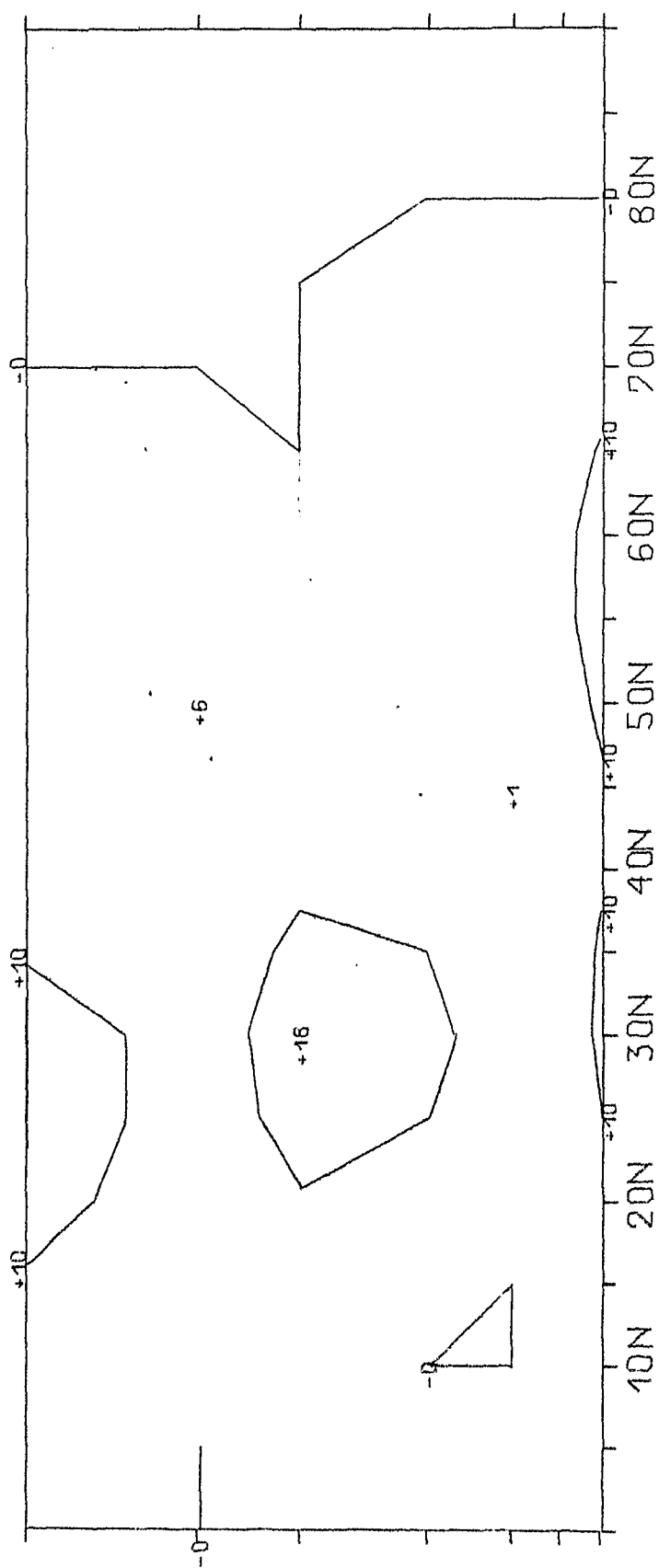
$A_{MSE, 2-3} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT.69

KENNZIFFER: 42107000



$A_{MSE, 2-3} 10^{-3} J CM^{-2} MB^{-1} OKT.70$

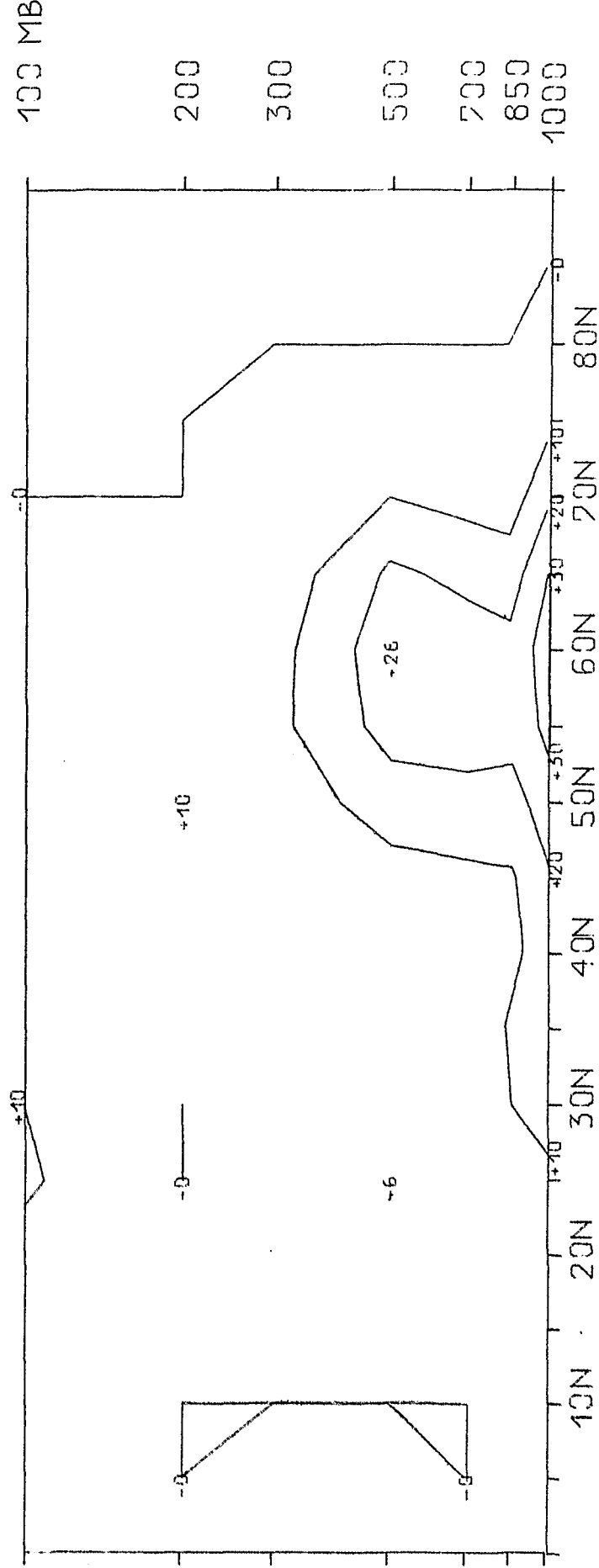
KENNZIFFER: 42107100



SE 1956. 2. 2

$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.71}$

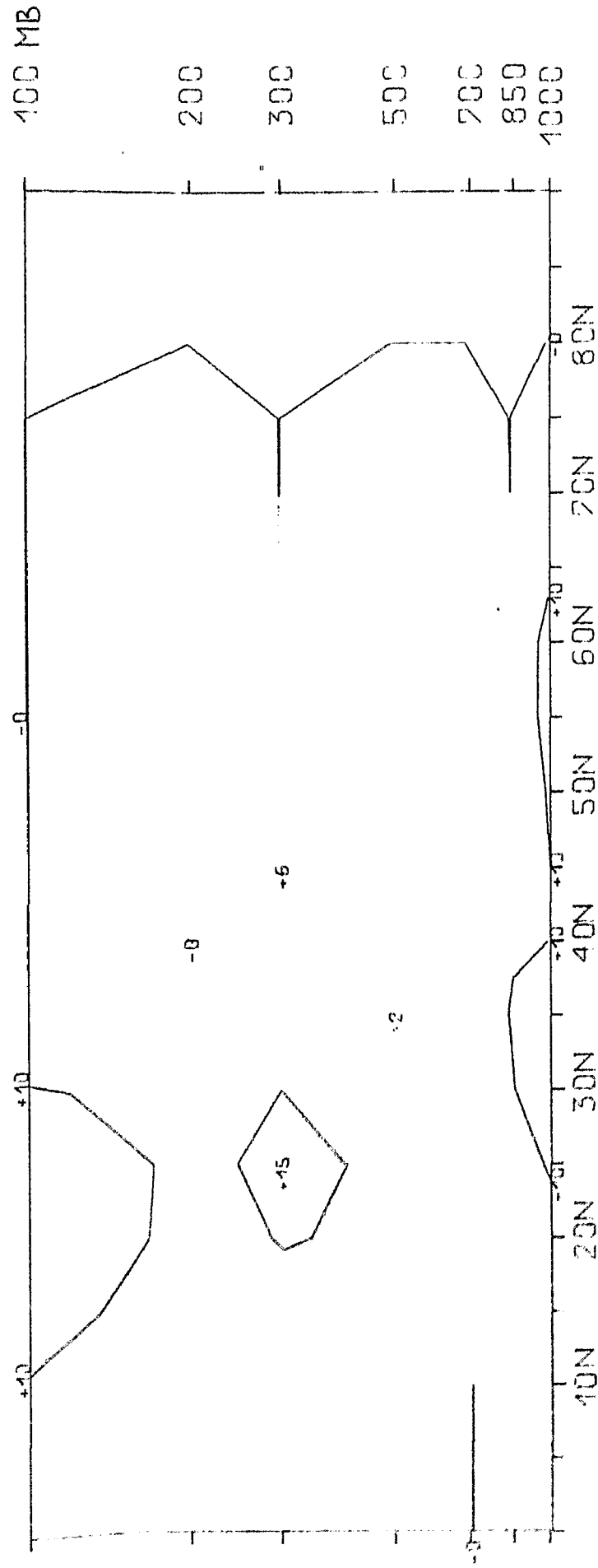
KENNZIFFER: 42107200



$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.72}$

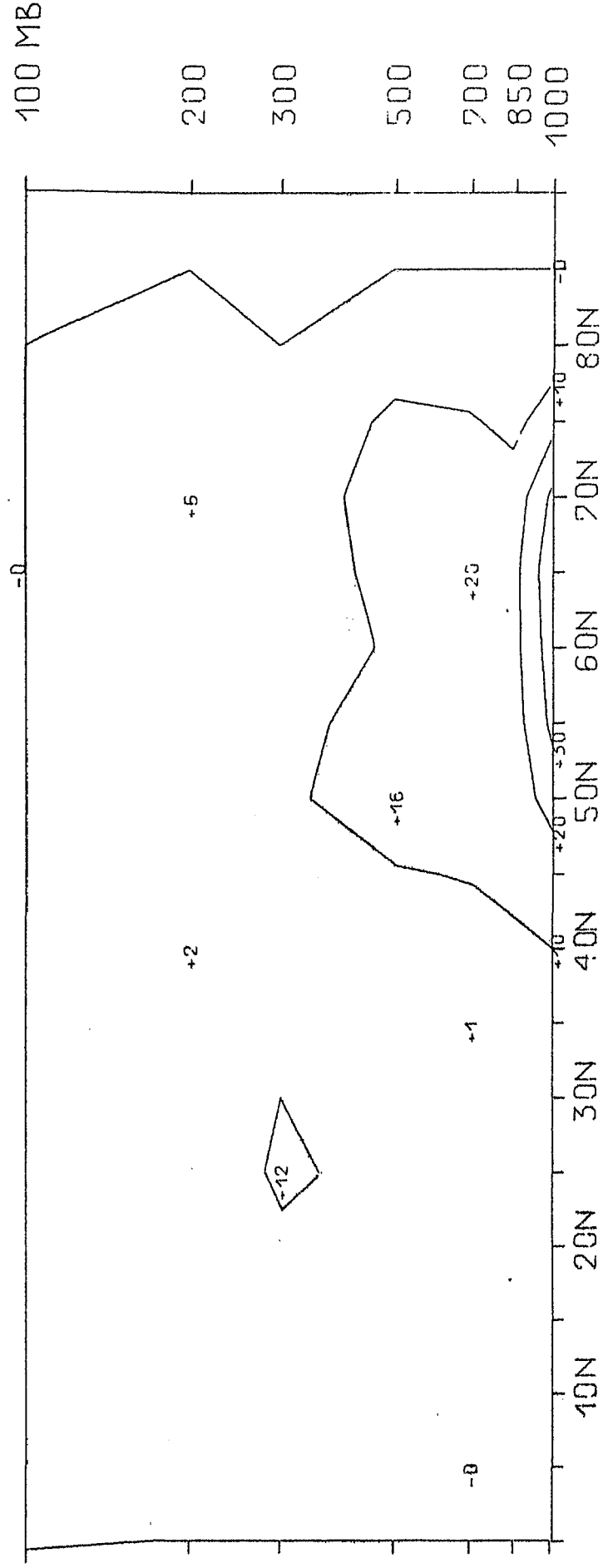
Abb.110

KENNZIFFER: 42107300



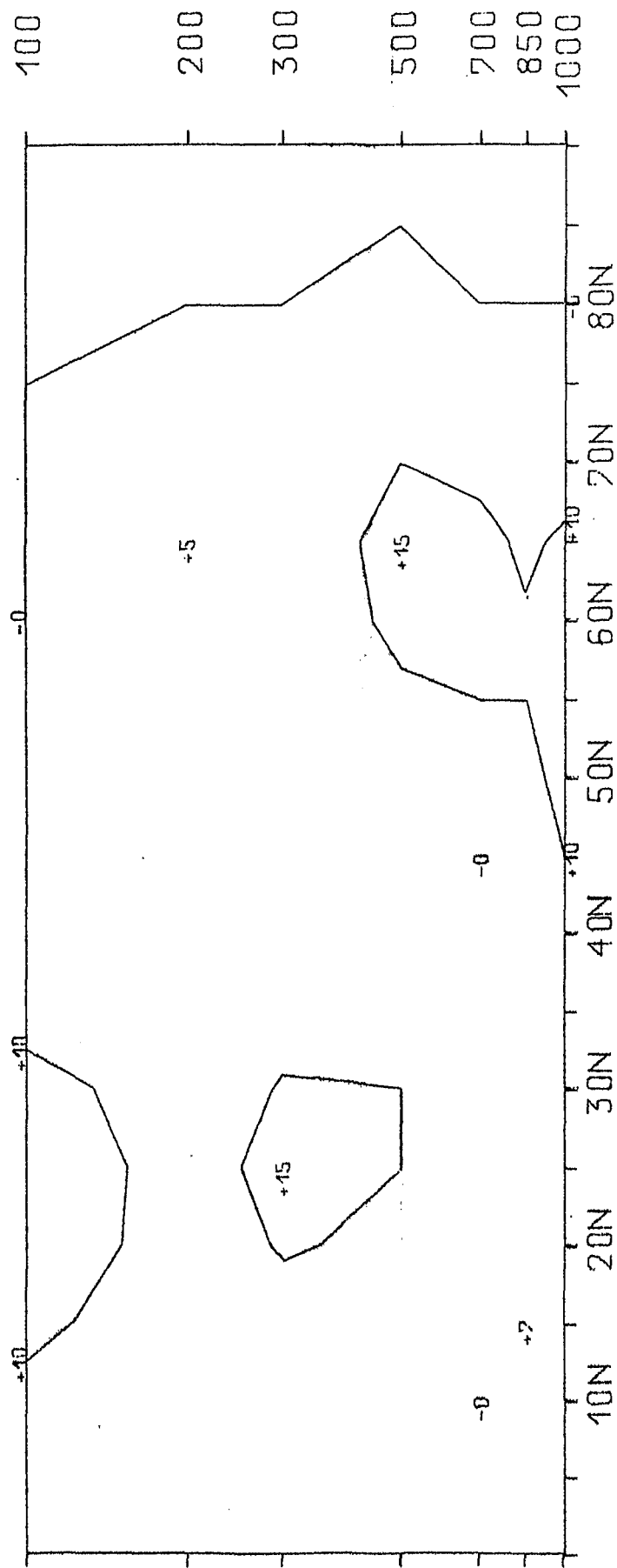
$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.73}$

KENNZIFFER: 42107400



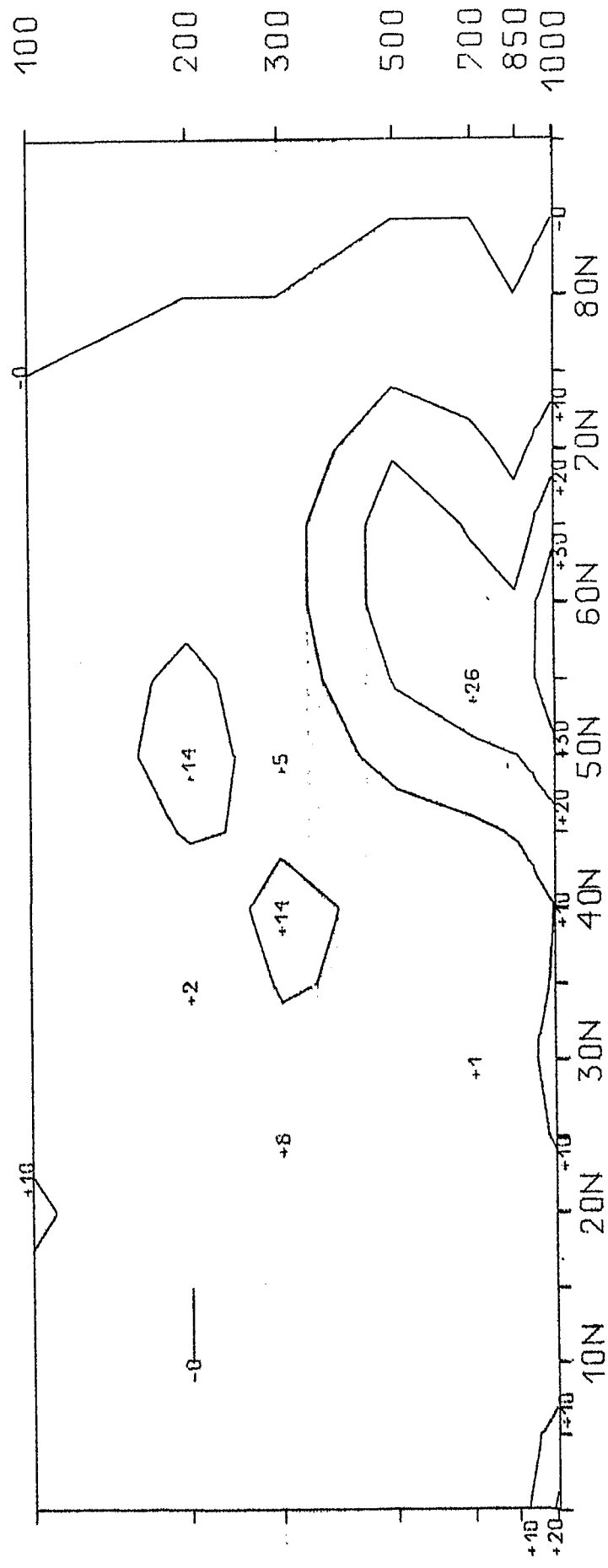
$A_{MSE} \sim 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.74}$

KENNZIFFER: 42107500



$A_{\text{MSL}} 2 - 3$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT. 75

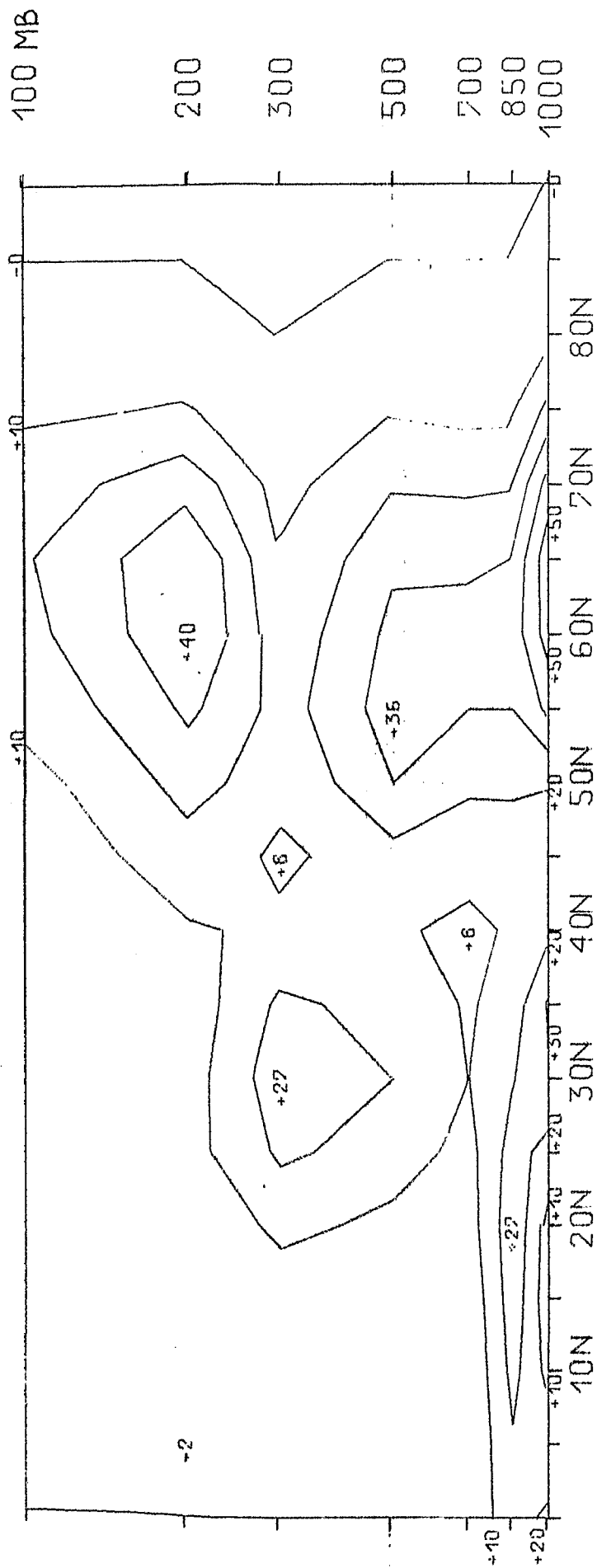
42107600



OKT. 76

Abb. 112 b

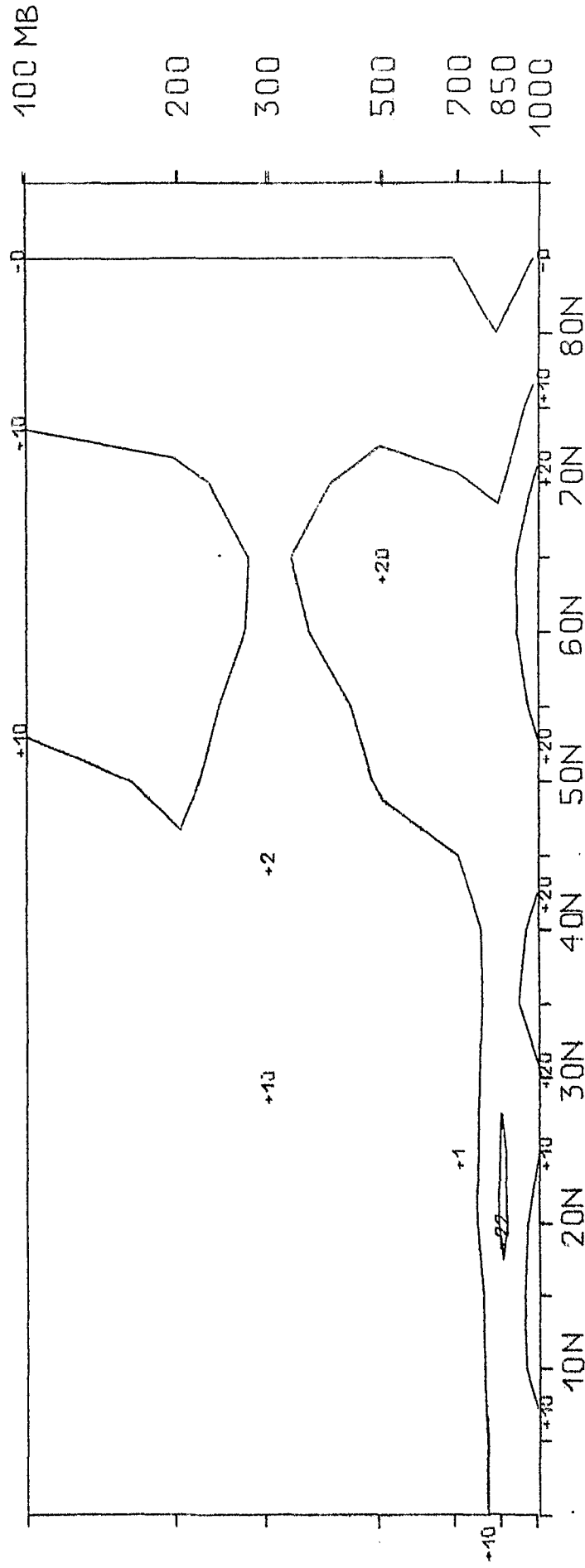
KENNZIFFER: 43046200



A $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 67

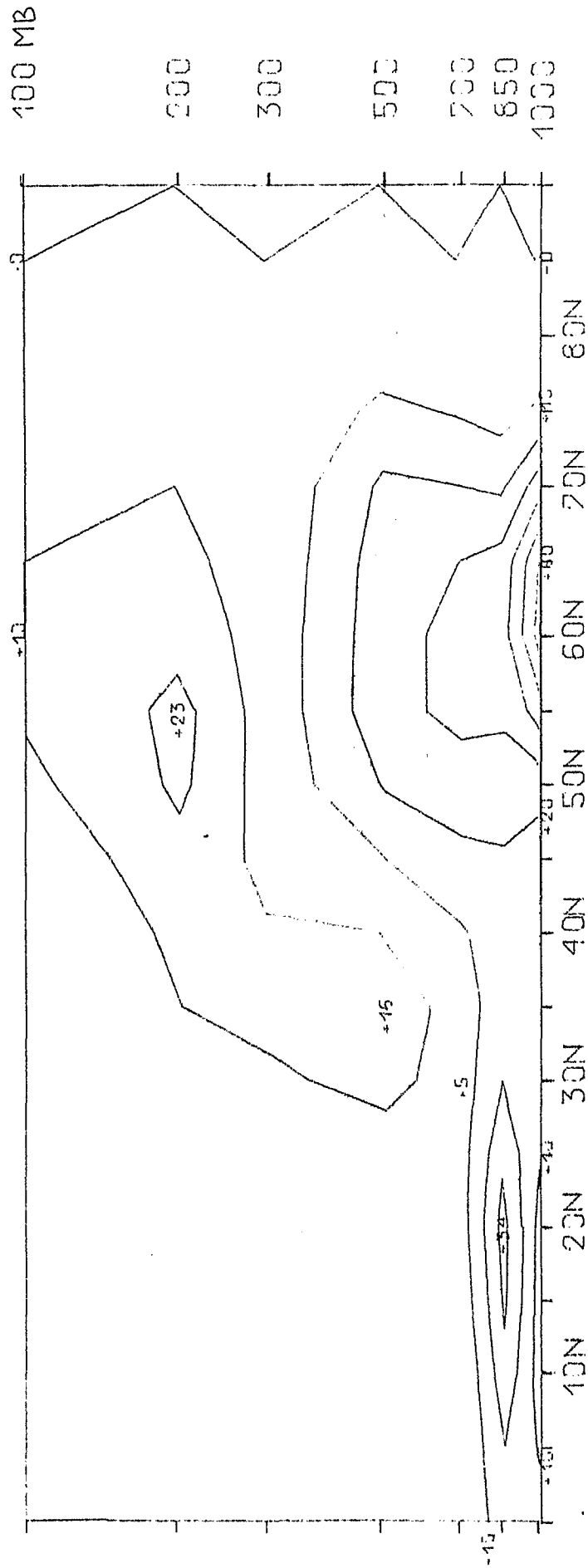
MSE, 1 - 3

KENNZIFFER: 43046800



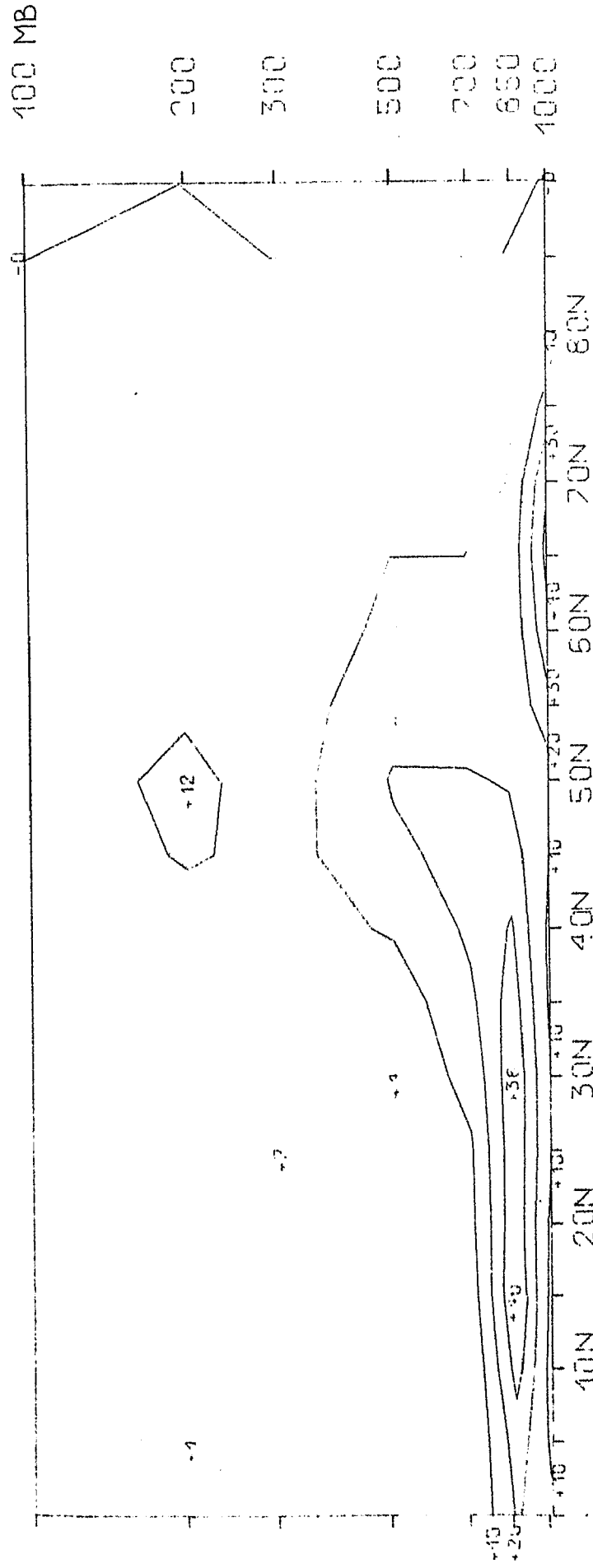
$\bar{A}_{MSL, 1-3} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 68

KENNZIPFER: 43046900



$\bar{A}_{MSE} \times 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 69

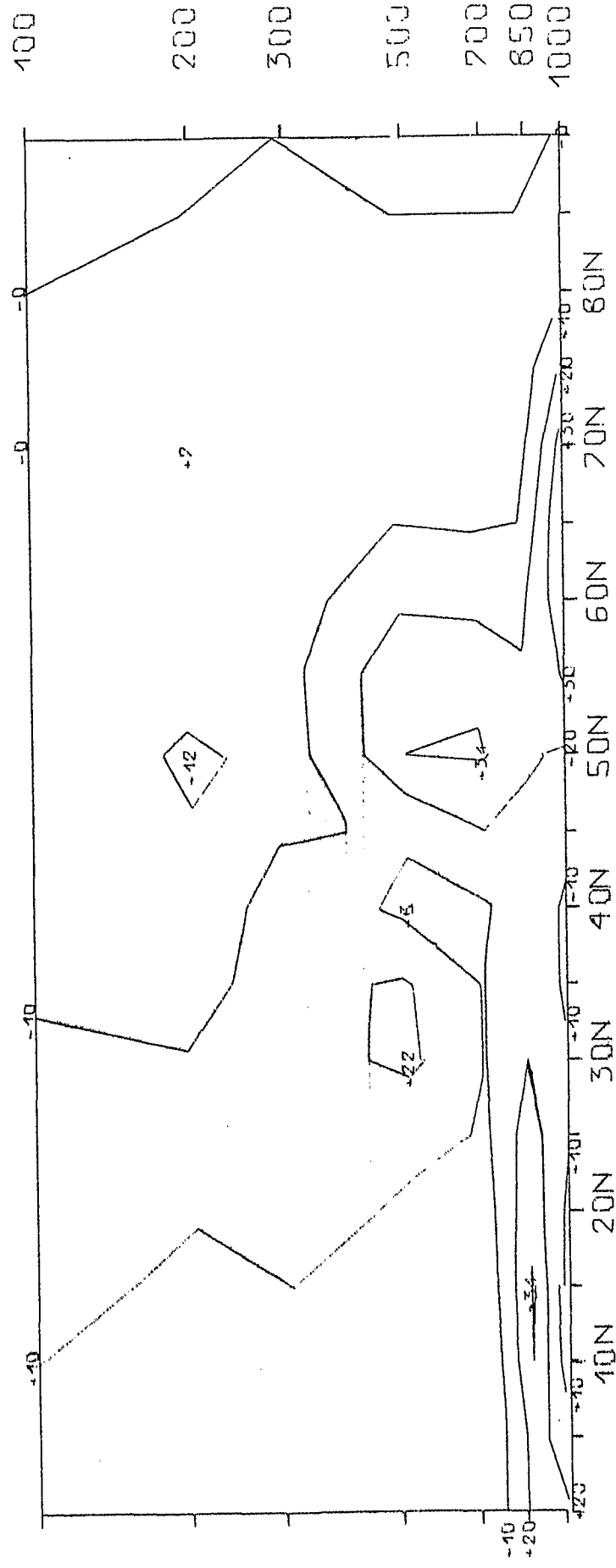
KENNEDY FFR 43042000



$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 70

FR 18E - 3

KENNZIFFER: 43047100

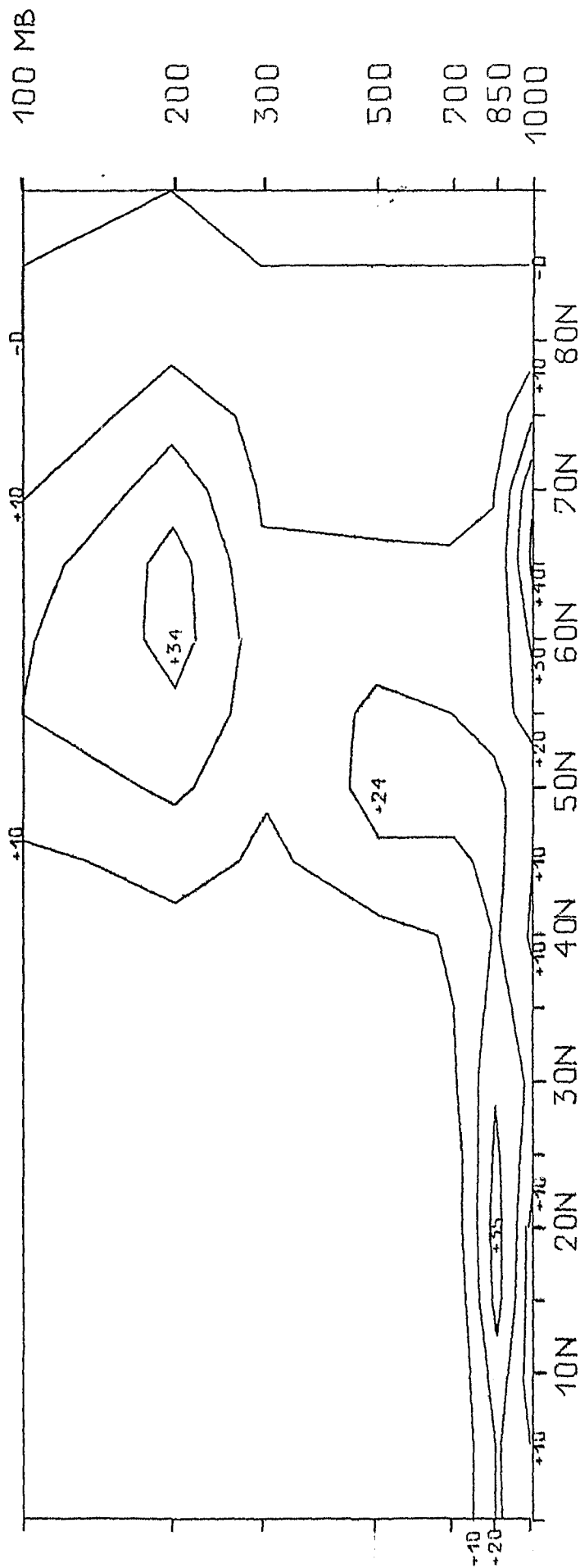


$P_{MSE, 1-3}$

$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$

APRIL 71

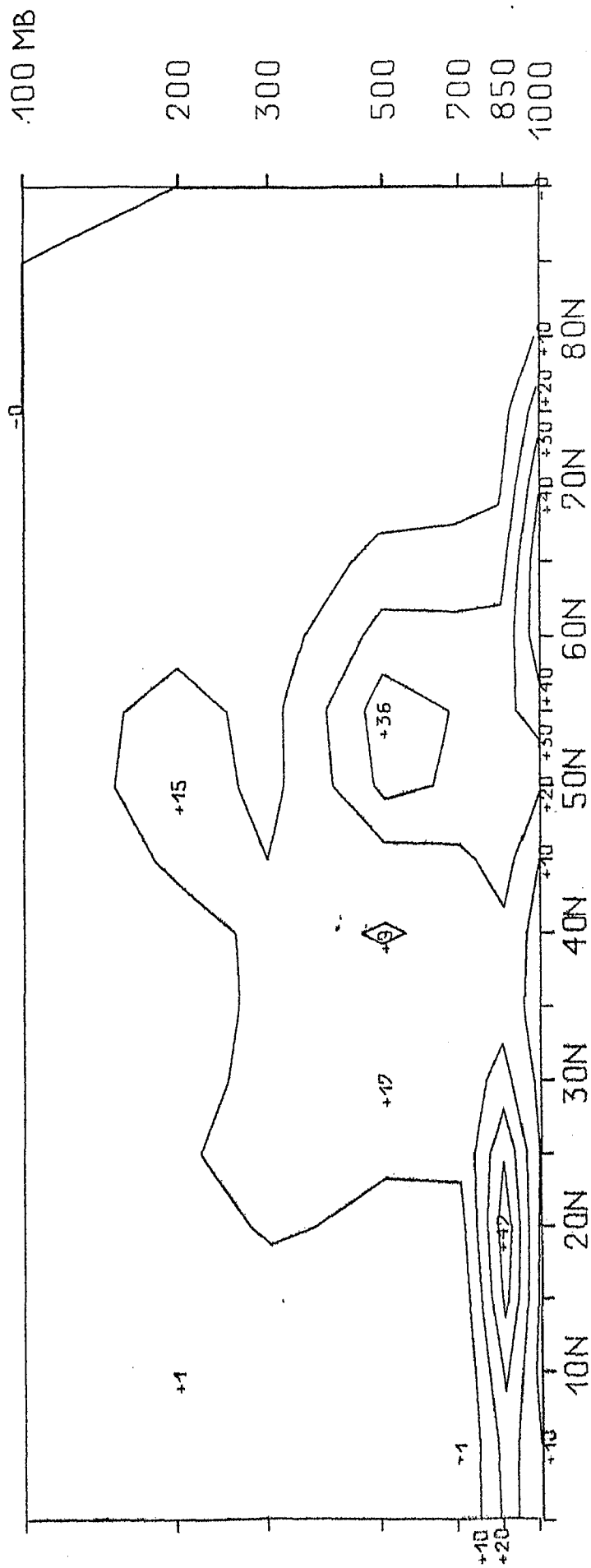
KENNZIFFER: 43047200



A $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 72

MSEL 1 - 3

KENNZIFFER: 43047300

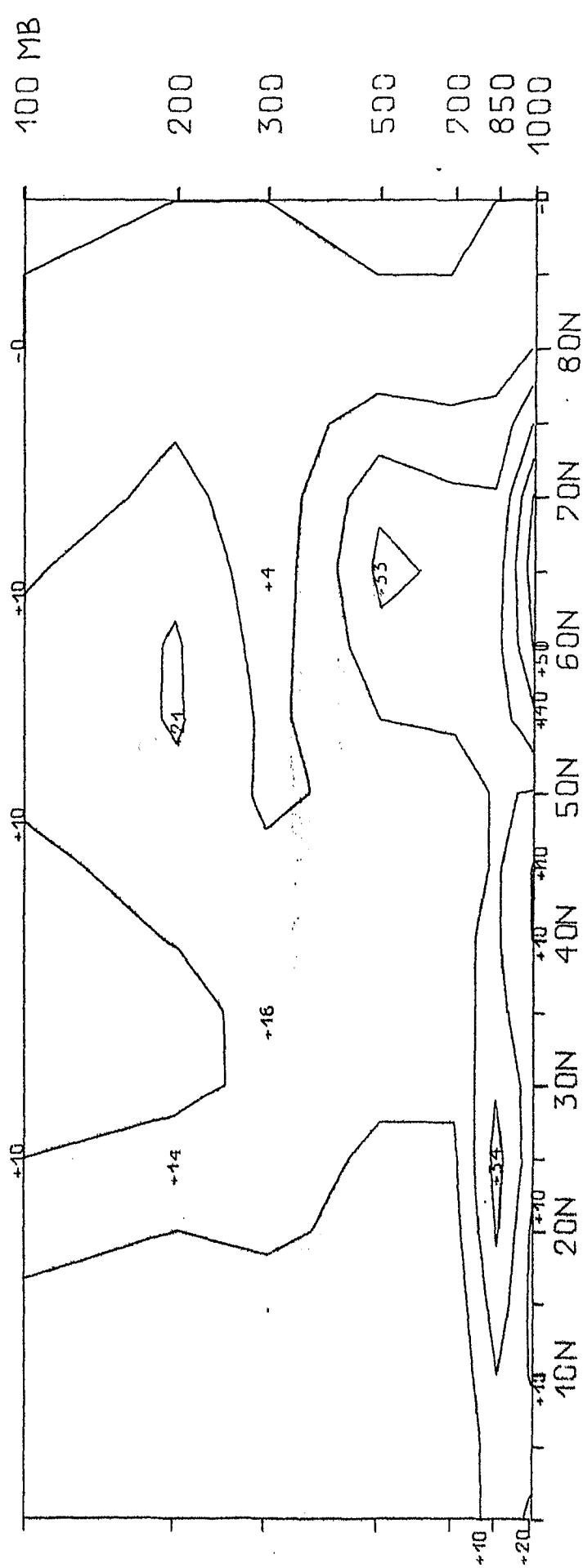


$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 73

A_{MSE, 1 - 3}

Abb. 119

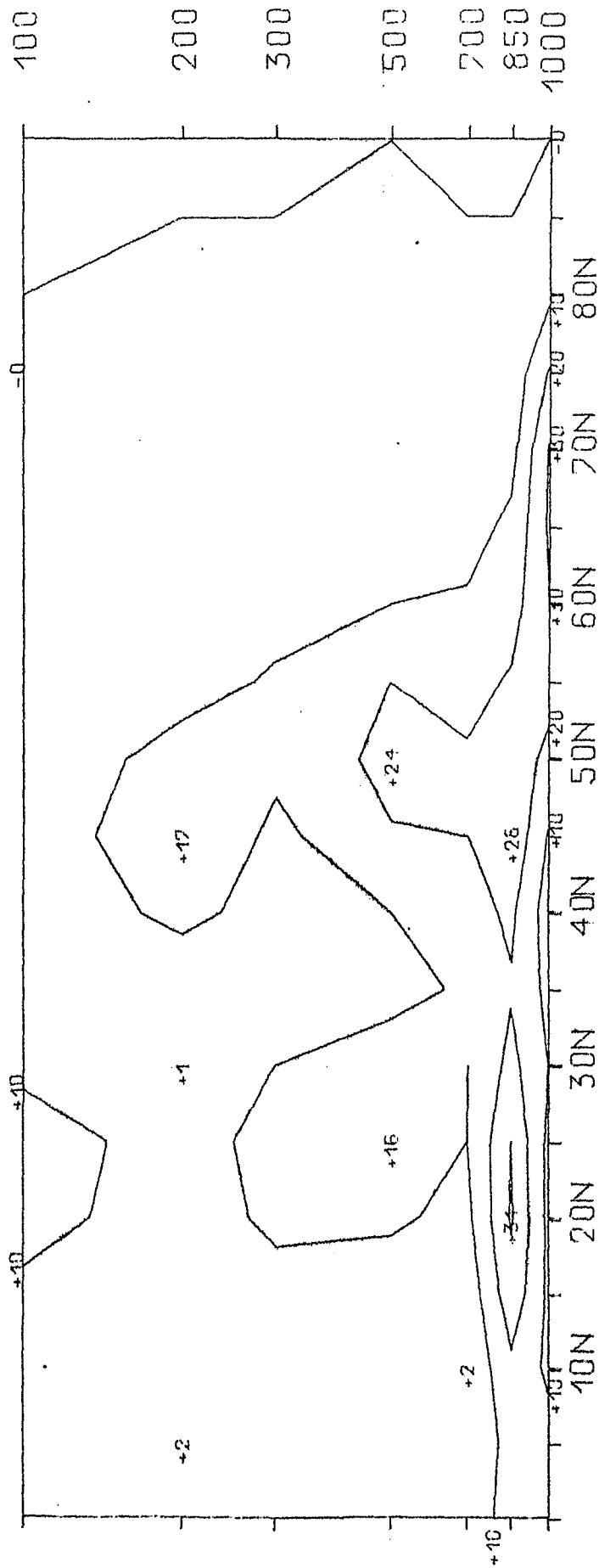
KENNZIFFER: 43047400



A_{MSE, 1 - 3} $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 74

Abb.120

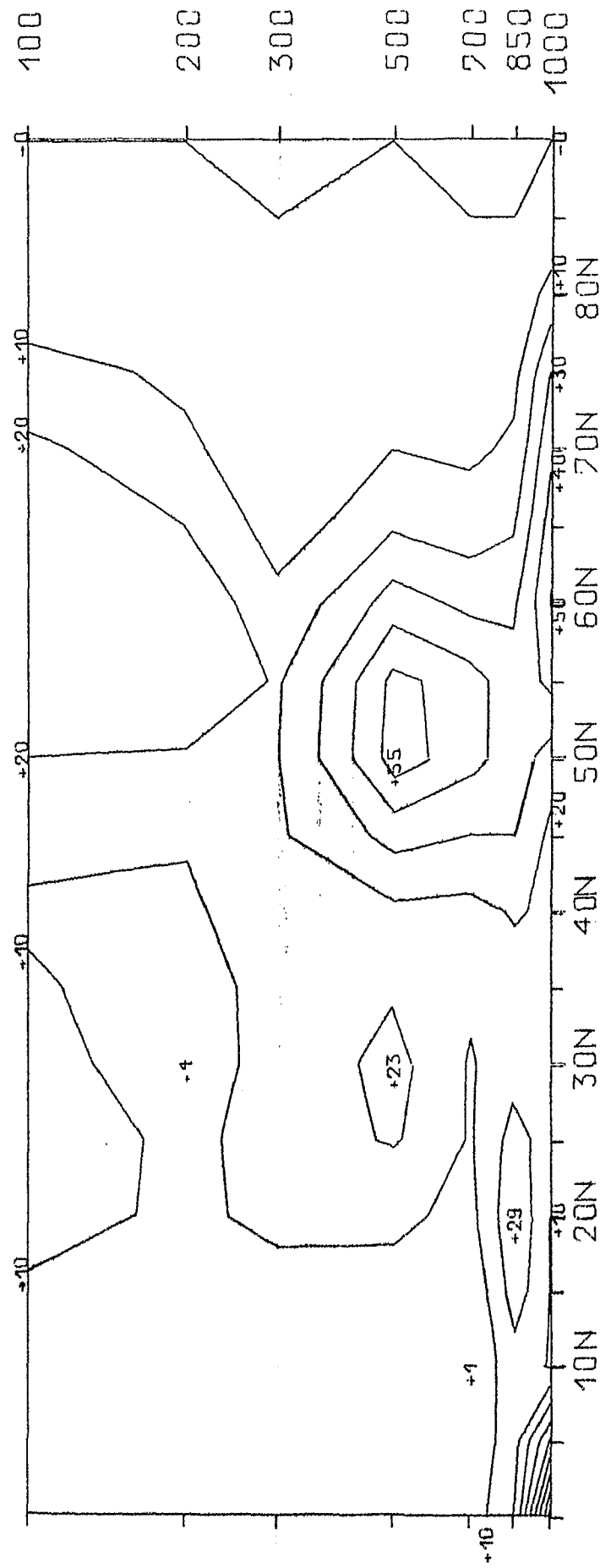
KENNZIFFER: 43047500



$F_{MSL, 1-3} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 75

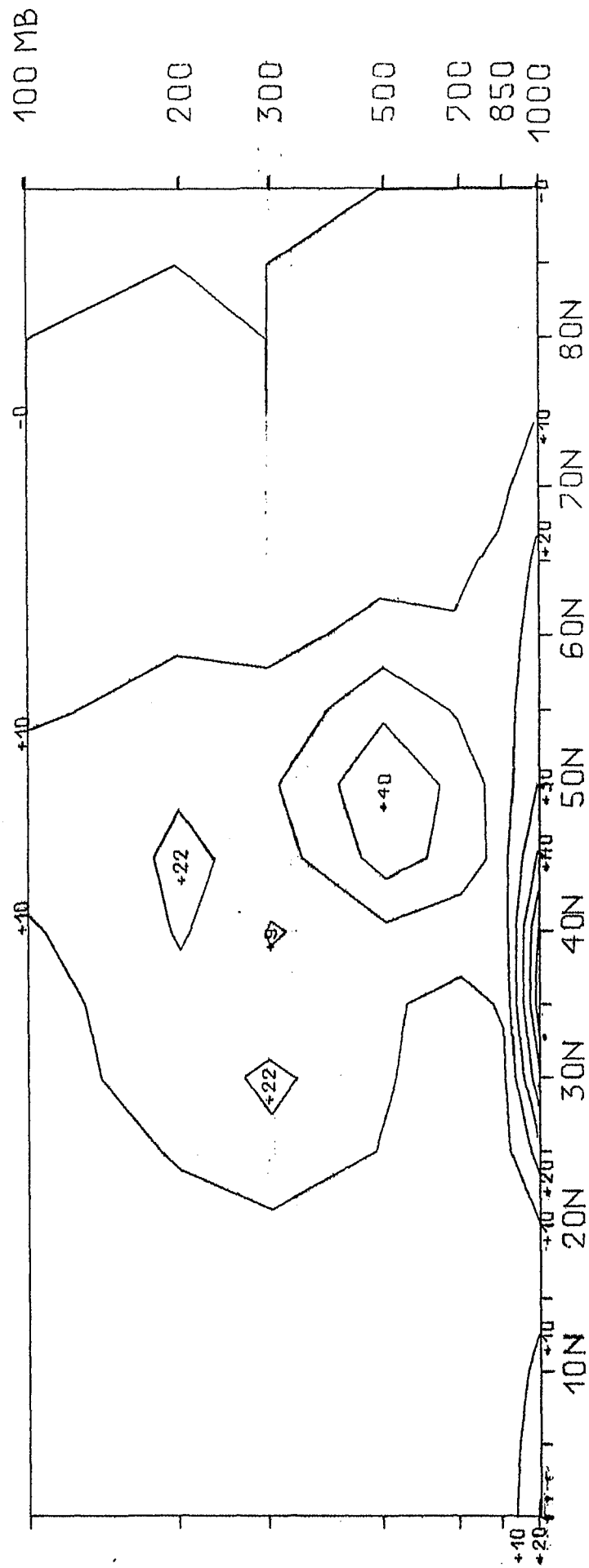
Abb.120 a

KENNZIFFER: 43047600



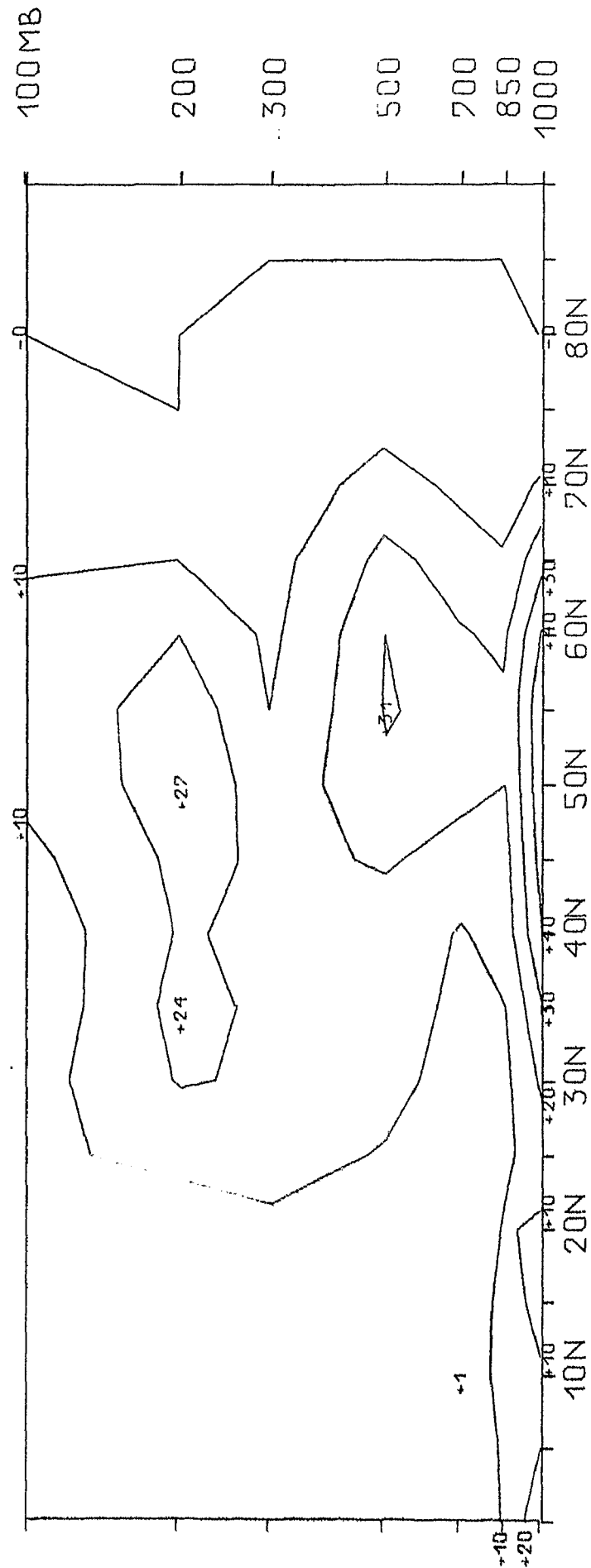
$A_{MSE.4 - 3} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ APRIL 76

KENNZIFFER: 43106700



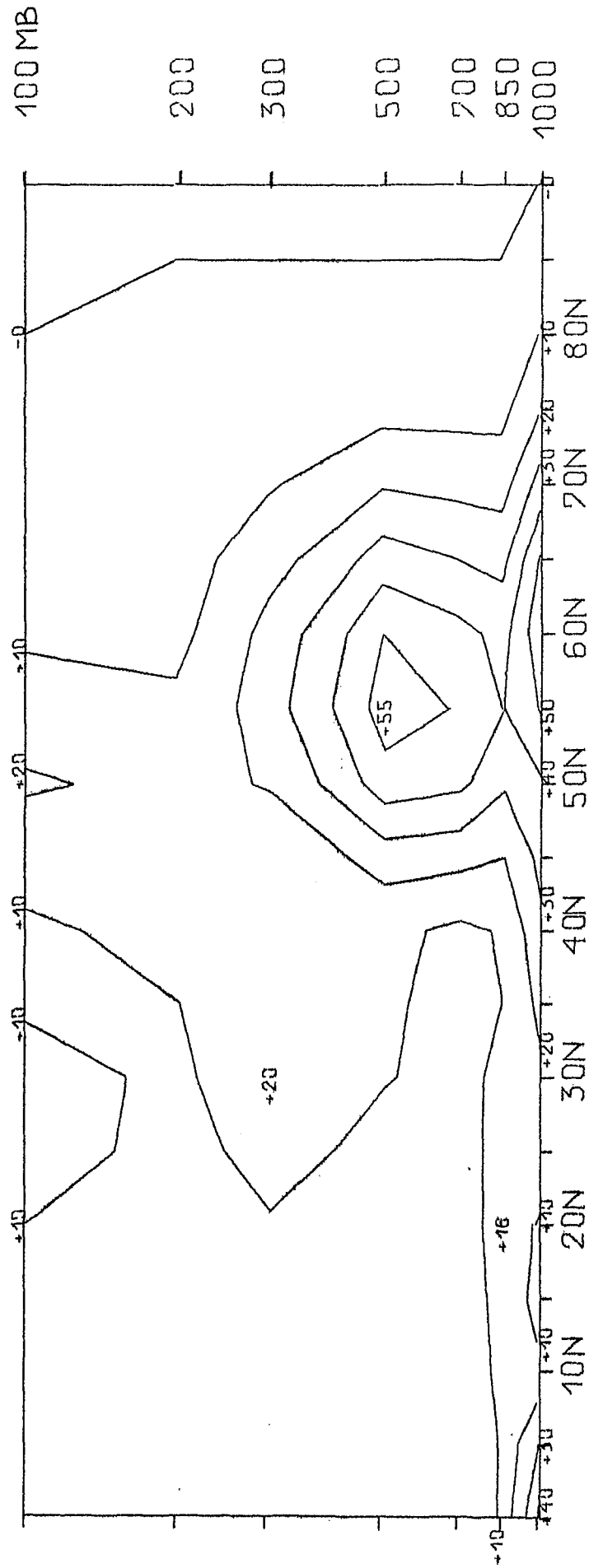
$A_{MSE, 1-3} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.67}$

KENNZIFFER: 43106800



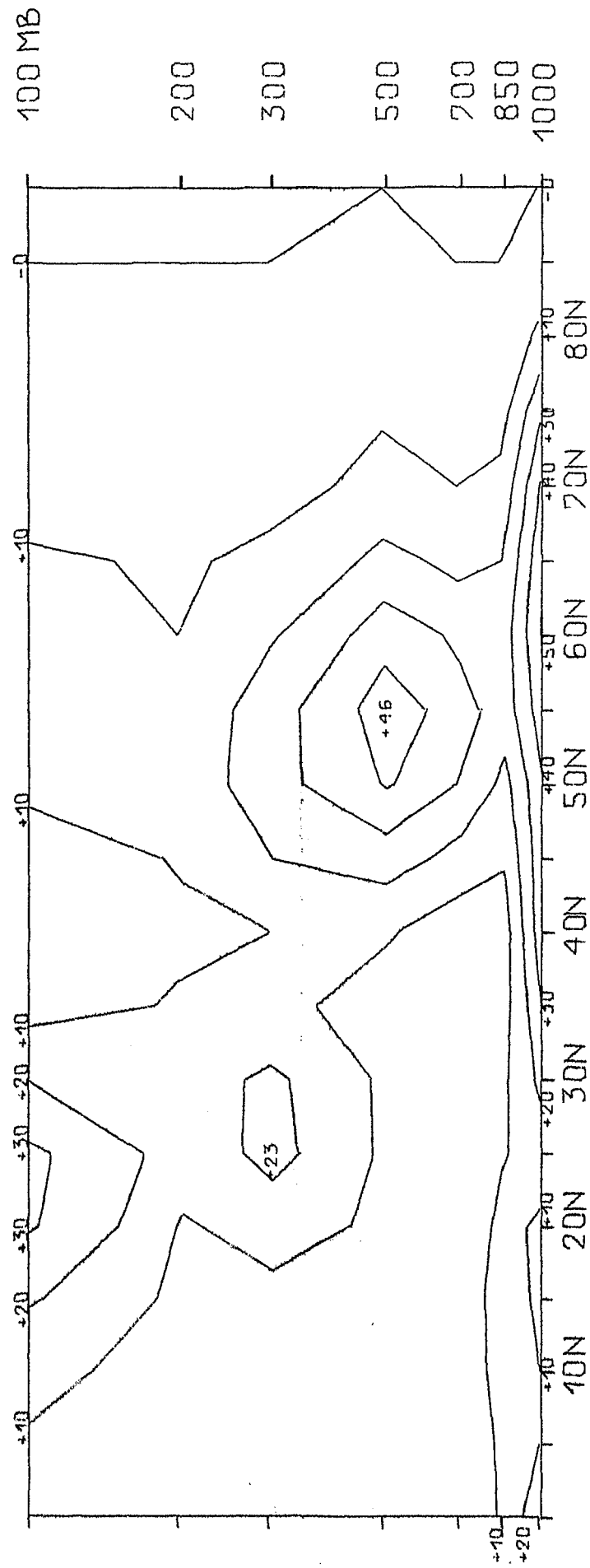
$\bar{A}_{MSE, 1-3} \cdot 10^{-3} \text{ J} \cdot \text{CM}^{-2} \text{ MB}^{-1} \text{ OKT. 68}$

KENNZIFFER: 43106900



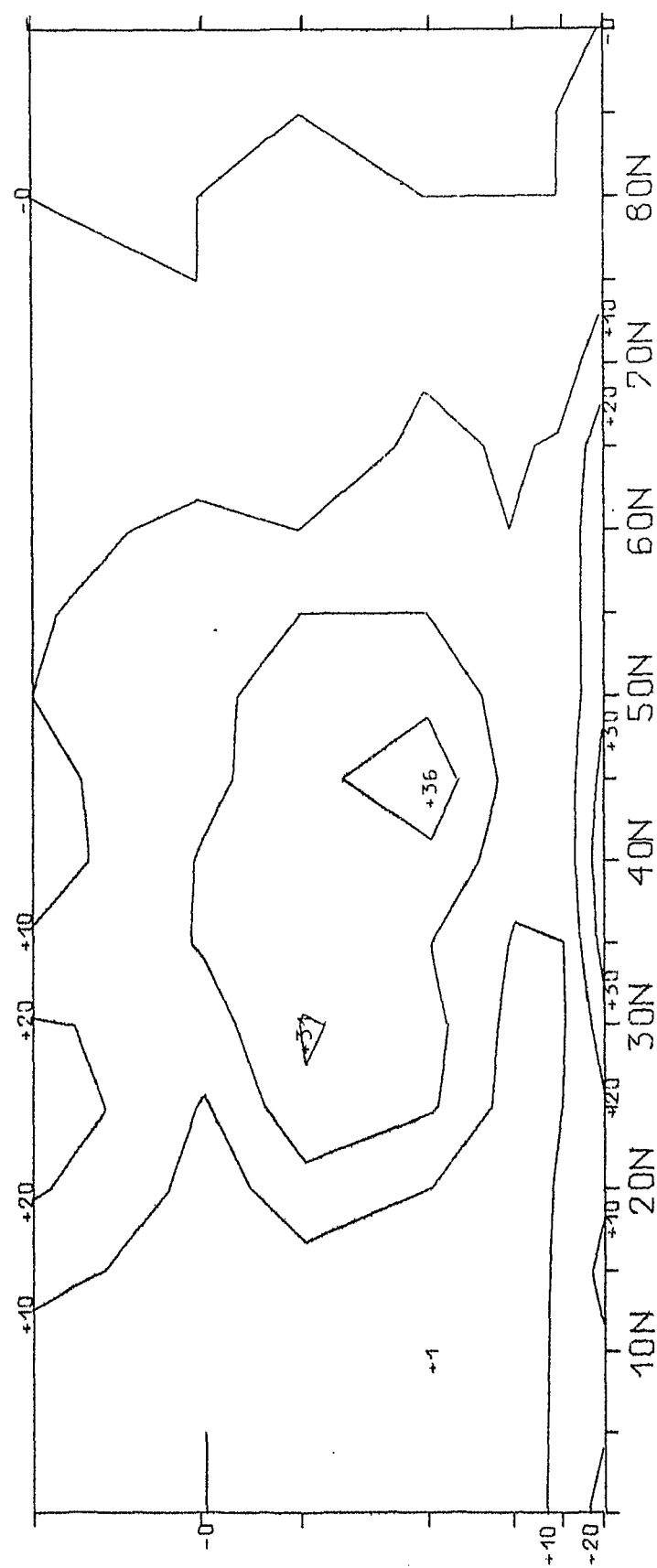
$A_{MSE, 1-3} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.69}$

KENNZIFFER: 43107000



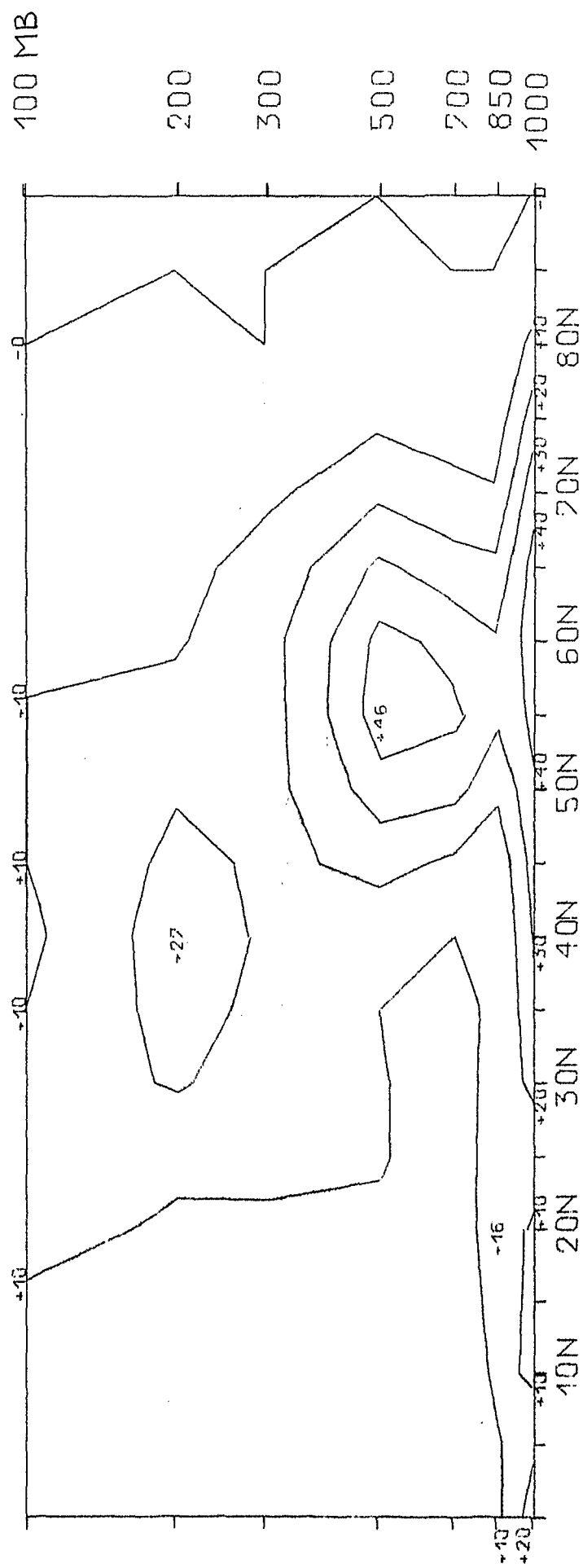
$A_{MSE, 1-3} \quad 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.70}$

KENNZIFFER: 43102400



$A_{MSE, 1-3}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.71}$

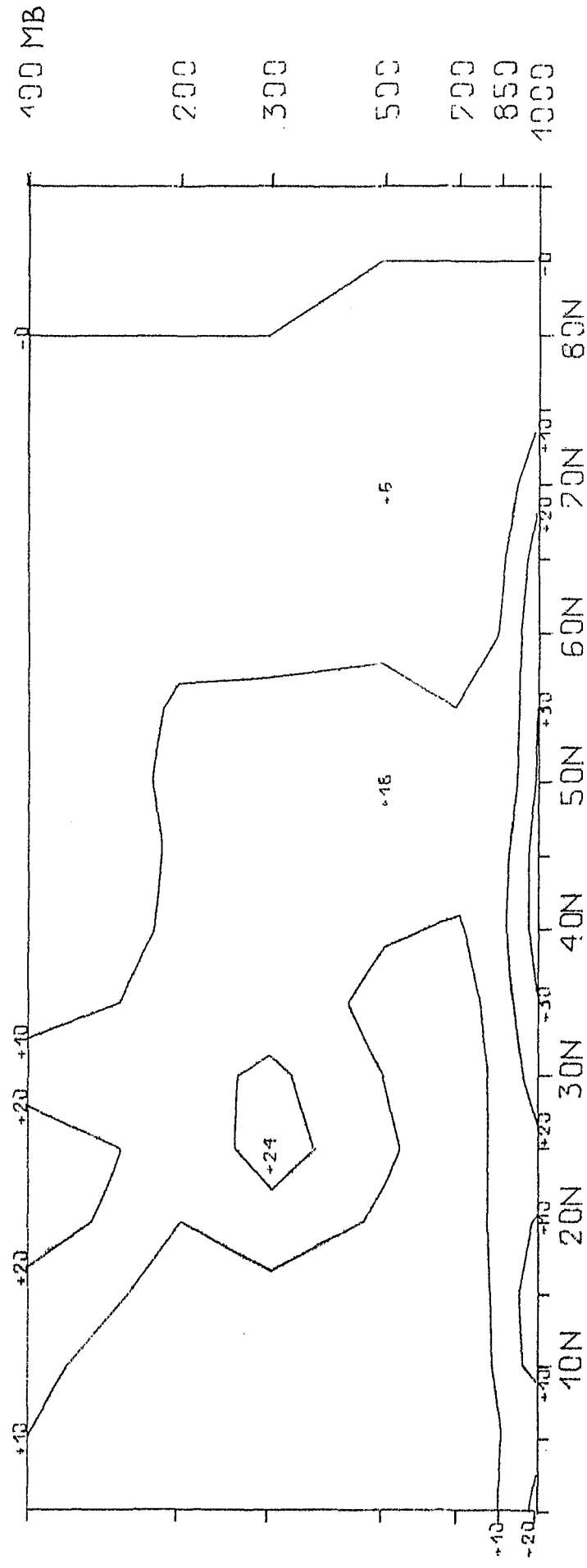
KENNZIFFER: 43107200



$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.72}$

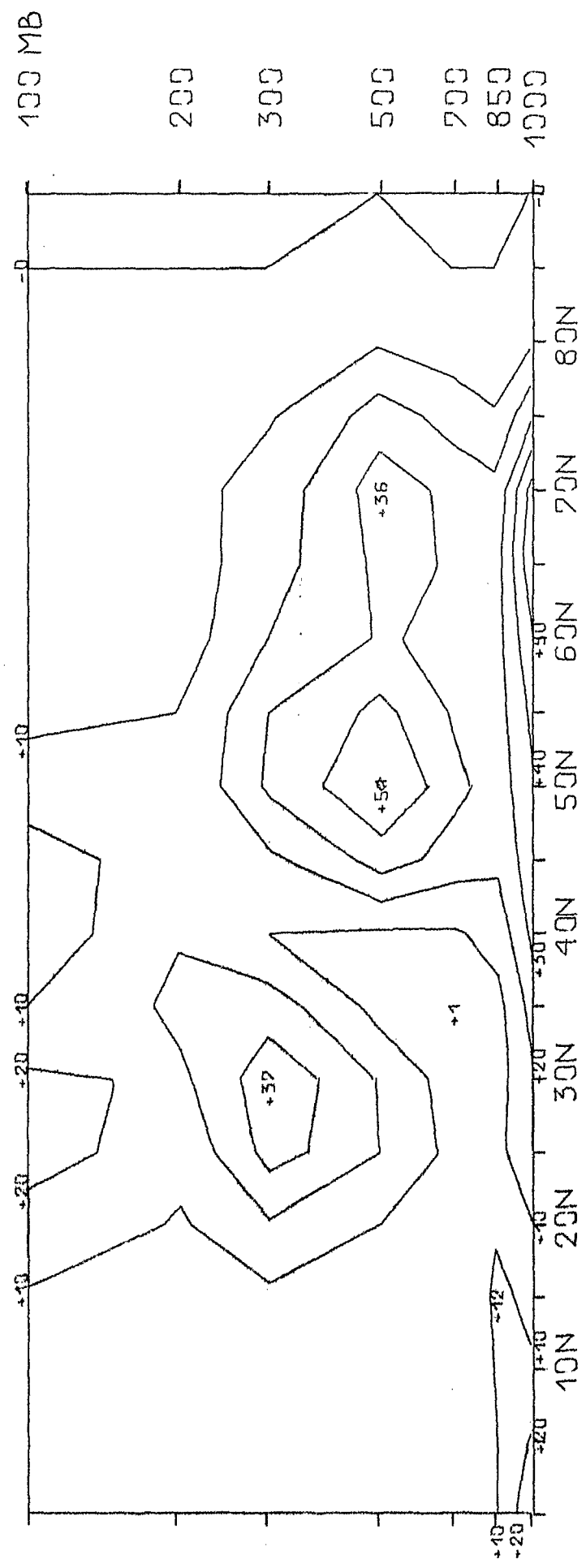
Fig. 1 - 3

KENNZIFFER: 43107300



$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT. 73}$

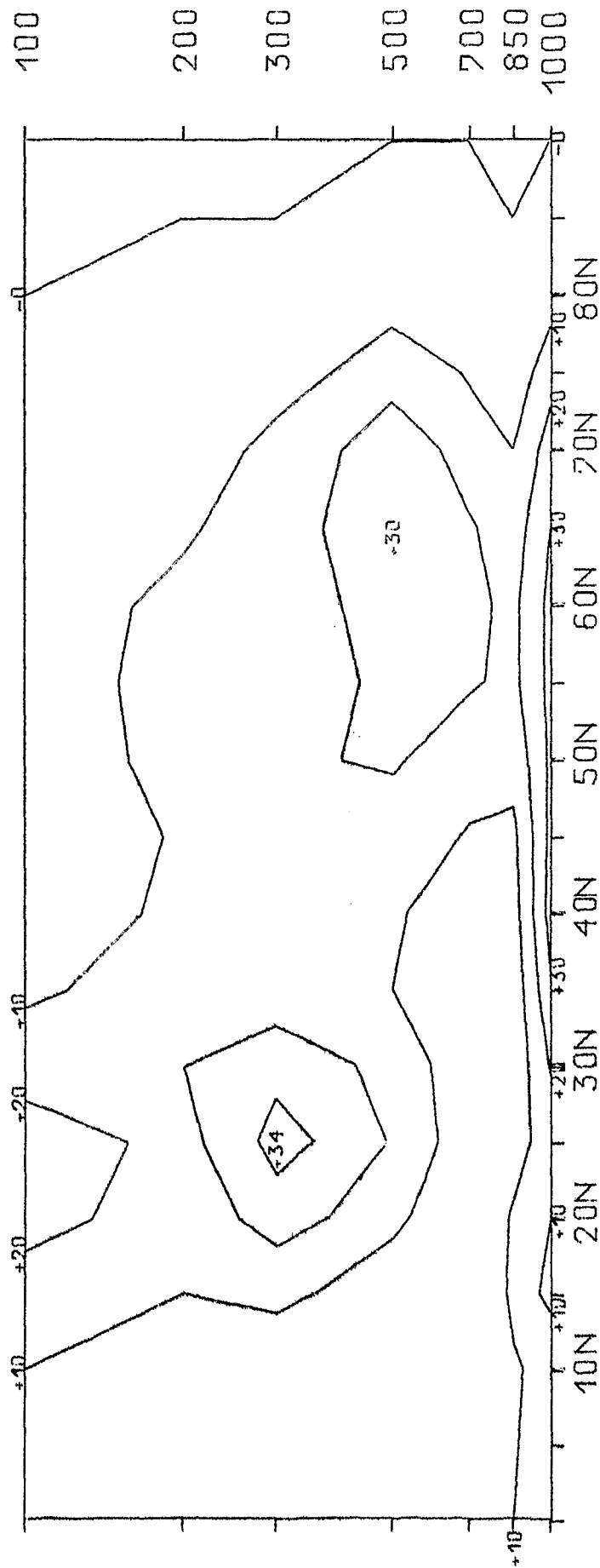
KENNZIFFER: 43107400



$10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1} \text{ OKT.74}$

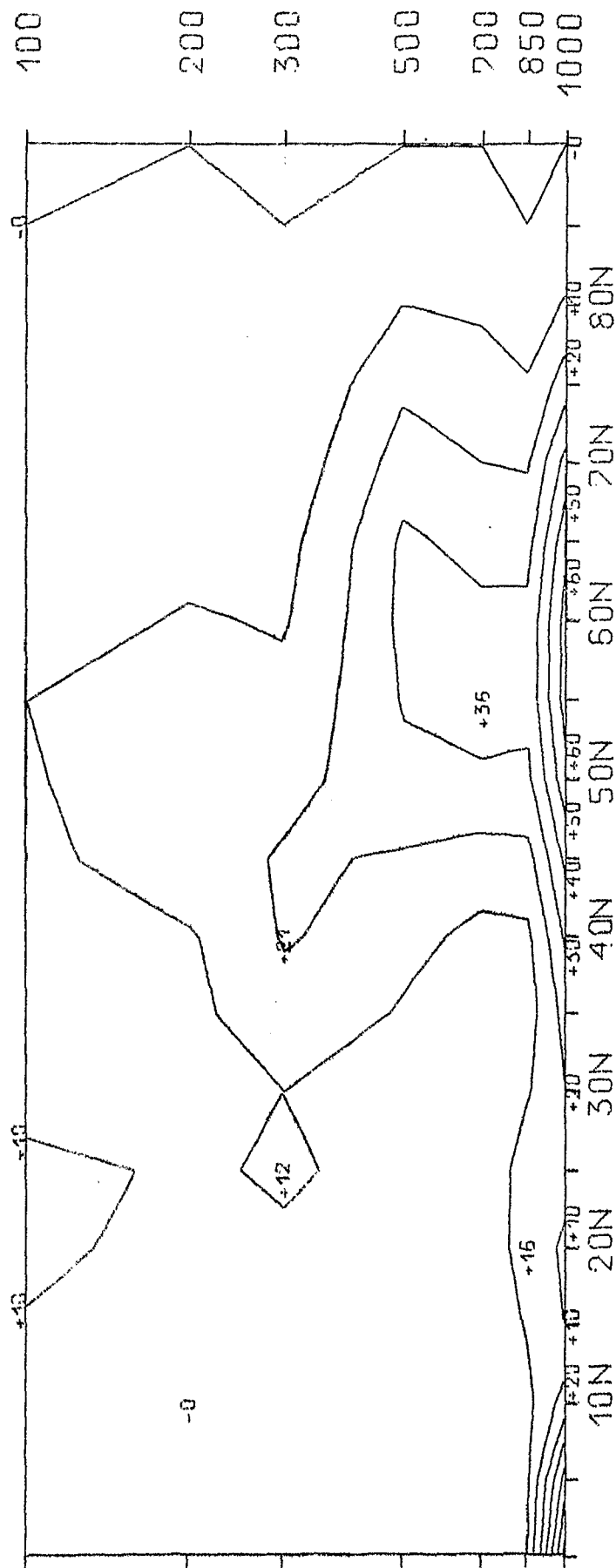
A MSE: 1 - 3

KENNZIFFER: 43107500



$A_{MSE: 1-3}$ $10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT. 75

KENNZIFFER: 43107600



$A_{MSE. 1-3} \cdot 10^{-3} \text{ J CM}^{-2} \text{ MB}^{-1}$ OKT. 76